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CLINICAL MANAGEMENT OF THE PREMATURE INFANT.¹

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Melbourne.

It cannot be too strongly emphasized that success in the management of a premature baby depends fundamentally on meticulous and faithful nursing. Helpful though special equipment may be, the most elaborate measures for humidification, heat control and oxygenation of the environment of a premature baby are to be regarded as ancillary to nursing skill. The management of the premature baby is governed by the following considerations of the difficulties of the prematurely born infant in his extrauterine environment: (i) inability to control body temperature; (ii) tendency to atelectasis; (iii) mechanical difficulty in taking feedings; (iv) feeble digestive powers and limited gastric capacity; (v) diminished resistance to infection; (vi) general bodily weakness.

THE PROGNOSIS.

The prognosis varies with the following factors: (a) length of gestation; (b) cause of prematurity (intrauterine anoxæmia prejudices the outlook); (c) the condition of the mother; (d) the type of birth.

PLACE OF DELIVERY.

All statistics show a higher mortality rate among infants moved to other institutions after birth, than among babies who are delivered and nursed in the same institution. It is highly desirable, therefore, that whenever possible the mother should be delivered in the institution where the baby is to be nursed.

¹Read at a meeting of the Victorian Branch of the British Medical Association, on September 7, 1949.

CARE AT BIRTH.

At the baby's birth the following equipment should be in readiness. (i) A wrap, sterile and previously weighed and warmed. This should be of such a pattern as to prevent the infant from freeing the arms, and should not be tight enough to constrict the arms against the chest. Cotton-wool covered with gauze or gamgee tissue is the most useful. We have found the type of garment depicted in Figures I and II to be most satisfactory. (ii) Oxygen. (iii) "Lobeline" in weak strength solution—three milligrammes per millilitre. (iv) A warmed, lined cot at a temperature of 95° F., at the bedside or in the operating theatre. (v) Vitamin K analogue ("Menadione") in water-soluble form.

The infant is received into the warmed wrap, and whenever possible the cord is allowed to cease pulsating before it is cut. The blood so received from the placenta is valuable to the baby, being equivalent to a small transfusion. Should the infant's condition be too precarious, however, the cord may be divided earlier. Mucus is then removed in the usual manner, and the infant is transferred to the cot with its head low. An injection of vitamin K analogue is then administered—for example, 0.5 millilitre of "Synkamine" or 0.25 millilitre of "Hykinone". Oxygen is also given continuously. Should the infant be slow to breathe, "Lobeline" (0.5 millilitre) may be injected either subcutaneously or into the umbilical vein in the cord. The infant is removed to the "premature" nursery, generally within one hour of birth. He is left undisturbed for the first six hours, except to inspect the cord and to take the temperature every two or three hours. This may be taken in the groin or the rectum, and endeavours should be made to keep the temperature at 98° to 98.4° F. in the groin or 99° F. in the rectum. After the first six hours the temperature is recorded every three hours until it is stabilized, and then it is taken every six hours. The ill-effects of too high or too low temperatures will be discussed later.

ROOM.

The room in which the premature infant is nursed should have an air-lock to minimize the risk of air-borne infections. There should be 30 to 50 square feet of floor space for each cot. It is advised that there should be four babies to a room, since this is the number which it is estimated one nurse can care for, and such a unit minimizes traffic. The temperature of the room should be in the neighbourhood of 70° F. and the humidity around 65%. In the newer hospitals air-conditioning is a great boon.

ATTENDANTS.

It is most important that medical and nursing attendants, also domestic staff who enter the "premature" room, should be free from infection of all kinds. Gowns and masks should be worn by all.

WHEN TO HANDLE THE BABY AFTER BIRTH.

The time after birth when the infant is disturbed will depend on his condition, and must be an individual matter in each case. A useful working rule is that babies of five pounds or over can be handled six hours after birth, babies of four pounds or over twelve hours after birth, babies of three pounds or less twelve to twenty-four hours after birth. In the case of very sick infants any handling at all may prove fatal. Such infants may require to be left undisturbed for forty-eight hours.

As a routine procedure, the infant is not bathed or oiled, any blood or meconium being removed with oiled swabs. The best dressing for the cord is a sterile zinc, talc and boracic powder, as methylated spirits sometimes proves irritating.

Since the diaphragm is the main muscle of respiration in the premature baby, and since these infants have a great tendency to atelectasis, it is important that the abdominal movements of respiration should be allowed free play. The binder, therefore, must not be too tight, nor must it be too wide. We find it desirable to dress these babies, like ordinary infants, in singlet, napkin, gown and bonnet. If left for a long period in their gamgee wraps they tend to sweat and develop sweat-rashes which may become infected. In wrapping these infants care should be taken to see that free chest movement is possible. One not infrequently sees infants so tightly wrapped that the arms splint the sides of the chest, greatly interfering with thoracic respiration.

OXYGEN.

Oxygen is given as a routine measure for twenty-four hours to all babies weighing under five pounds. Thereafter its administration is continued as long as necessary—a period which may vary from twenty-four hours to six or seven weeks. If the infant is not breathing, oxygen will need to be administered by intranasal catheter. To the breathing infant it may be given by tent or by oxygen bassinet.

While the tents are generally useful, there may be the disadvantages that they require to be removed for the passing of gavage tubes or for bottle feeding. In hot and humid weather humidity in the tent may rise to undesirable figures, causing sweating and dehydration of

the larger premature babies. The oxygen bassinet (for example, the type manufactured by the Commonwealth Industrial Gases) obviates both these difficulties. Where this bassinet is used it is important that those in charge understand that the baby must be "drowned" in the oxygen. The oxygen, being heavy, fills the bassinet from below, so that the baby lies in a pool of oxygen. The cot should be covered over, a space of one or two inches being left at the head. A small window of transparent material—for example, X-ray film—allows inspection of the infant. It is desirable to have a high-water mark on the inside of the cot, below which the infant's head should be kept. These bassinets are of use only in rooms free from draughts and strong currents of air.

The oxygen is generally run at a rate of four litres per minute when the oxygen cot or tent is used, and six to eight bubbles per second by nasal catheter. It is desirable that the tubing carrying the oxygen should pass between hot-water bags in order to warm the oxygen.

"CARBOGEN."

"Carbogen" is often useful in stimulating depth of the respiration, and may be given for five minutes every hour or as is deemed necessary, the effect on the infant being watched. Occasionally the baby may become more cyanosed when given "Carbogen".

TRANSFER.

If the infant is to be moved to another institution, it is most important that he should travel under conditions in which he is kept warm and with a continuous supply of oxygen available. In cities where a special premature baby ambulance is available it should be used. Where this is not possible the infant should be moved in his own cot, with an oxygen cylinder, and in a closed motor-car. The optimum time for moving these babies is from twelve to twenty-four hours after birth.

PENICILLIN.

If the infant requires resuscitation, or if atelectasis is present, routine administration of penicillin is employed as a prophylactic measure for the first two or three days.

The usual dosage is 3000 units every three hours or 20,000 units every twelve hours.

FEEDING.

It has long been customary to give these babies only boiled water for twenty-four hours and 5% glucose solution for the next twenty-four hours, acting on the analogy of a full-time baby. Some authorities give nothing by mouth for forty-eight hours. However, the premature infant is not born prepared for this period of semi-starvation, and we have found that the infants do better if fed earlier. Therefore, we begin feeding them six to twenty-four hours after birth, according to the infant's condition. The infant is left for an hour or more after it has been dressed, and feeding is then begun. In general, five pound babies are fed six to eight hours after birth, four pound babies twelve hours or so after birth and two to three pound babies twelve to twenty-four hours after birth. In the case of those very sick infants who will not stand any handling, it may not be possible to start feeding for forty-eight hours or so.

Mode of Feeding.

The mode of feeding will depend on the infant's powers. If he is able to suck he is fed by bottle. If he is unable to suck, but is able to swallow, he can be fed by a pipette



FIGURE I.



FIGURE II.

or a Brecht feeder. If he is unable to suck or swallow, gavage feeding will be required.

Every infant who requires gavage should have his own individually measured tube. A straight line is drawn from the bridge of the nose to the xiphisternum, and this distance is marked off with cotton from the tip of the catheter. This gives the distance from the baby's lips to the cardia of the stomach. A further mark should be made on the catheter three-quarters of an inch to one inch distal to this. The cardia of the premature infant's stomach is lax and readily allows regurgitation of gastric content, which may be aspirated if the infant is lying flat. Therefore, when food is to be given by gavage, the head of the cot should be raised and left in this position thereafter.

Prior to gavage, the infant should be placed on his right side and the tube passed to the further mark so that the eye of the catheter lies in the stomach. The syringe is then attached and the amount of any gastric residue is noted. The subsequent feedings are reduced by an amount equal to the residue obtained. In this way the size of the infant's feeding can be readily controlled and the danger of over-filling the stomach, with subsequent vomiting and the risk of aspiration of gastric content, is greatly diminished. The tube is then withdrawn so the first mark is level with the lips and the feeding is run in. It is desirable that this should not be done too rapidly, and the catheter should be pinched on withdrawal. The infant should be left on his right side for one and a half hours after the feeding, then turned to his left side for the next one and a half hours. Should the infant be distressed by the passage of the gavage tube, it may be left *in situ* strapped to the cheek. It is taken out each twenty-four hours, boiled and reinserted.

Type of Feeding.

It is wise to give 5% aqueous glucose solution as the first feed. Saline should not be given as it tends to cause oedema.

Breast Milk.

Wherever possible, expressed breast-milk should be obtained for premature infants. The age of the infant of the mother supplying the breast-milk is immaterial. Breast-milk, unfortified, has too low a protein content for the nutritional requirements of the premature baby. From about the second day, therefore, it is advisable to fortify it with a 25% solution of casein hydrolysate, such preparations as "Pronutrin" or "Casydrol" being suitable. One tablespoon of such a preparation to one ounce of water gives approximately a 25% solution. This may be sterilized by simmering in a water bath in a corked bottle for twenty minutes. Two and a half millilitres—that is, approximately three-quarters of a teaspoon—per pound of body weight of this solution, are added to the day's feeding. If the infant weighs three pounds or less it is wise to dilute the breast-milk with equal parts of 5% glucose solution for the first day or so.

Artificial Feeding.

It is recommended that artificial feeding should not be begun during the first week of life of the premature baby. However, if breast-milk is unobtainable, artificial feeding must be resorted to, and the following scheme has been found safe. Casein hydrolysate solution (25%) is added to the artificial feeding in the same amounts as used for the breast feeding. The following feedings may be utilized.

1. Dried milk mixtures we find preferable to wet milk, because of the greatly varying fat content of wet milk and the standardized fat content of the dried milk. A mixture giving 20 Calories per ounce is the most useful, for example: "Glaxo" Number 2, eight tablespoons, 2.5 teaspoons, or "Lactogen", six tablespoons, 1.5 teaspoons; sugar of milk, three tablespoons, two teaspoons; boiled water to 20 ounces. The dried milk powder and the lactose are measured in a standard measure, pressed down and levelled off.

2. Lactone syrup milk feedings, made with wet or dried milk or "Ideal" unsweetened condensed milk, can be used.

The following three mixtures are suitable: (a) milk, 20 ounces (boiled and cooled), with the addition of two tablespoons of lactone syrup; (b) "Glaxo" Number 2, 14 tablespoons, or "Lactogen", 10 tablespoons two teaspoons, with boiled water up to 20 ounces; to this, when cold, one tablespoon three teaspoons of lactone syrup are added; (c) Nestlé's "Ideal" unsweetened condensed milk, eight and a half ounces, boiled water up to 20 ounces, to which when cold six teaspoons of lactone syrup are added. Ten parts of the lactone syrup mixture and one part of boiled water constitute the final mixture.

In the first three days, use one part of the feeding and one part of 5% glucose solution. In the next three days, use two parts of the feeding and one part of the 5% glucose solution. In the next three days use three parts of the feeding and one part of 5% glucose solution, reaching the full strength by the tenth day or so. Should the infant show evidence of digestive difficulty, the strength should be increased more slowly. In those cases in which breast-milk is to be replaced by an artificial feeding, the change must be gradual. Every day, one or two drachms of the breast-milk in the individual feeding are replaced by the artificial feeding, the rate of replacement depending on the baby's digestive powers.

3. Should the infant show digestive difficulty with the above routine feedings, a "Nestlé's" sweetened condensed milk may be used, starting with a strength of one in twelve or one in ten, increasing to one in eight. As with the other feedings, casein hydrolysate solution is added.

Interval and Frequency and Amounts of Feeding.

We employ a three-hourly interval, the infants being fed eight times in twenty-four hours. More frequent feeding tends to exhaust the infant. As regards the amount, a schedule which has been found safe for the great majority of premature babies is to give an amount per day equivalent to half an ounce per pound of body weight for each day of feeding. That is, on the first day the infant is given for the twenty-four hours an amount equal to half an ounce per pound of body weight; on the second day he is given twice this quantity; on the third day three times this quantity; on the fourth day four times this quantity; on the fifth day five times this quantity; on the sixth day six times this quantity. On the sixth day, therefore, the infant is getting his full fluid and caloric requirements—namely, three ounces of fluid and 60 Calories per pound of body weight per day. These amounts are given as a basis from which to work and must in each case be suited to the individual child. The amount actually given is governed by the gastric capacity and the child's digestive ability. The gastric capacity is shown by the presence or the absence of residue on gastric aspiration before each feeding. If any residue is found, the size of the next feeding is reduced by an amount equal to the residue. The child's digestive ability also governs the feeding. The quantity of food is not increased should evidence of digestive difficulty appear—for example, vomiting or abnormal stools.

It is not infrequently found that the breastmilk may require dilution for some days, or that the increase of feeding must be slower than that stated above, so that the full amount of feeding may not be reached until some time in the second week.

VITAMINS AND HORMONES.

Ascorbic Acid.

Ascorbic acid is usually begun on the second day. Amounts are advised varying from 25 to 100 milligrammes daily. Clinically we have found that 25 milligrammes appear to be satisfactory.

Vitamin K Analogue.

The premature infant is more prone to hæmorrhage than the full-time infant, owing to the immature state of the walls of the veins and to the longer period of post-natal hypoprothrombinæmia, which is said to persist in these infants until the tenth day. Injection of the vitamin K analogue is repeated on the third, sixth, and ninth days.

Hormones.

Maternal blood during pregnancy has a high oestrin content. Therefore, we administer to infants weighing under four pounds one-quarter of a milligramme of stilboestrol per day, beginning about the fourth day. Along with this, thyreoid (whole gland) is given, in a dosage of one-twentieth of a grain per pound of body weight per day.

Vitamins A and D.

The administration of vitamins A and D is commenced about the seventh day, preferably in the "multivitamin" form. One drop is given on the seventh day, and the dose is increased by one drop daily until the full amount is reached. Overseas workers stress the need for giving premature infants double the amount of vitamin D given to full-time babies. We have given our Melbourne babies less than this and have been unable to trace rickets in the children. The usual preparations we have given are "Infant Pentavite" up to 15 or 18 drops daily, and "Abdec" up to 10 or 12 drops daily. It will be found that some

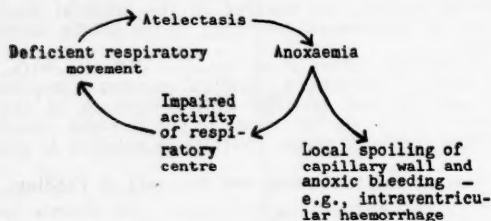


FIGURE III.

infants vomit or pass loose stools with these or with any preparations containing vitamin A. In these cases we have found that "Becadex" (Glaxo) can be tolerated. A start is made with a fraction of a tablet and the dose is increased to half a tablet daily.

OILING.

With regard to oiling, no definite routine practice can be recommended. The oiling is done when the infant's condition warrants it. In the case of very premature or sick infants this may not be for two weeks or so after birth. It is done in the bassinet, one portion of the infant being exposed and oiled at a time.

WEIGHING.

Since the size of the feeding depends largely on the weight of the infant, it is helpful if the initial weighing is done as soon as possible after birth. The infant is placed on the scales in his previously weighed wrap, and his weight can be thus rapidly and accurately obtained. Thereafter the infant is weighed weekly or less frequently according to his condition.

HANDLING.

The infant should be handled only when absolutely necessary, and this should be done as gently as possible.

COMPLICATIONS.

Atelectasis.

Atelectasis is the commonest cause of death among premature babies, being responsible for at least 50% of the mortality. It is predisposed to by the immature state of the respiratory centre and by the soft and yielding chest wall; this, being unable to withstand the pull of the diaphragm, allows retraction of the thoracic wall, so that the lungs do not expand normally. In atelectasis a vicious circle is set up. Because of the atelectasis the absorption of oxygen is below normal, with the production of further anoxaemia. This anoxaemia further impairs the activity of the respiratory centre, producing deficient respiratory movements and still further lowering the oxygen intake. The anoxaemia also produces local spoiling of the capillary wall in all the organs, causing dilatation

of the capillaries with congestion and transudation of the serum into the tissues. The exudation of the fluid into the alveoli still further hampers the gaseous interchange, cutting down the oxygen uptake still more. In the brain one is apt to find anoxaemic bilateral intraventricular haemorrhage as a result, in the extremely atelectatic premature infants. The signs of atelectasis are well known—cyanosis, pronounced chest retraction and increasing weakness. Occasionally there may be a profuse frothy discharge from the nose and mouth.

Treatment consists in the administration of oxygen, and in those cases in which it is found helpful, of "Carbogen". Penicillin is given as a prophylactic agent against post-atelectatic bronchopneumonia. The infant is nursed in that posture which is found best to promote efficient respiration.

Intracranial Haemorrhage.

Intracranial haemorrhage may be of the usual subdural type, or it may be of the anoxaemic type—for example, subarachnoid haemorrhage or the intraventricular haemorrhage previously mentioned. The latter tends to occur in the very premature infants in the previable group—that is, those weighing under two and three-quarter pounds and of under twenty-eight weeks' gestation. The signs of subdural haemorrhage are similar to those of the condition in the full-time infant—namely, cerebral cry, tendency to head retraction and rigidity and raised tension of the fontanelle. In intraventricular haemorrhage the symptoms are those of atelectasis, and the infants generally die within two or three days of birth. It is possible that in those who survive this condition, intraventricular haemorrhage may be a cause of internal hydrocephalus.

Inhalation of Food or Vomitus.

In the premature infant the cough reflex is absent, so that food or vomitus may be readily inhaled. Food may be inhaled if the infant is left with a propped bottle and the feeding enters his mouth faster than he can swallow. In the case of the older premature infant who is rebelling against gavage, food may be inhaled if the infant struggles during a gavage feeding. Vomitus is not infrequently inhaled if the infant is left lying flat, particularly if he is allowed to lie on his back. If the size of the gavage feeding is not controlled by routine pregavage gastric aspiration, inhalation of food may also occur. Such inhalation may cause death by suffocation or may set up aspiration bronchopneumonia which is often fatal.

Bronchopneumonia.

Bronchopneumonia may be of three types—post-atelectatic, the aspiration type, and the type following an upper respiratory tract infection.

In the treatment of all these infants, continuous administration of oxygen is a necessity. The post-atelectatic type usually yields to penicillin, the two last-mentioned types being treated with both penicillin and streptomycin. Streptomycin is given in a dose of 20 milligrammes per pound of body weight per day divided into four doses, at six-hourly intervals.

Subnormal Temperature.

If the infant is allowed to develop a subnormal temperature he becomes lethargic and oedematous. Later the oedema becomes brawny, though it still pits (scleroedema). Later still, the infant's fat sets solid, so that he appears to be encased in hard suet, the condition then being known as sclerema. These infants frequently develop terminal bronchopneumonia. Infants should be made warm and the body temperature brought up to normal. It is customary to give whole-gland thyreoid in a dosage of one-twentieth of a grain per pound of body weight per day.

High Temperature.

Where infants are over-zealously heated, pyrexia may be produced, with the attendant dangers of dehydration and delayed emptying of the stomach. As the premature infant becomes older, it may be found that he begins to have an elevated temperature due to the hot atmosphere

of the "premature" ward. When he is removed to the "ex-premature" room the temperature subsides.

Infections.

The commonest infections found among premature infants are skin sepsis, coryza, pyelitis, and epidemic diarrhoea of the newborn, all of which call for their appropriate treatment. Jaundice, which is universal in all premature infants of under thirty-six weeks' gestation, can scarcely be considered a complication. It has an earlier onset and tends to be more pronounced in infants of toxæmic mothers.

WHEN DOES PREMATURITY CEASE?

The end of an infant's period of prematurity does not depend on dates, but on the infant's ability to maintain his body temperature himself. Generally, this occurs when the infant is about five to five and a half pounds in weight. The baby is then "de-premmed": that is, the hot-water bags are removed one by one, the "premature" cot is dismantled, and if the infant still maintains his body temperature at normal he is taken to an "ex-premature" ward (the "cooling room" of the Scotch). Here he is nursed at ordinary room temperature. He is put to the breast for short periods at first. He is bathed as an educative exercise and is usually discharged from hospital when he reaches six pounds.

SEQUELÆ.

Early Anæmia.

Early anæmia is not affected by the administration of iron. In those cases in which it occurs it is usually pronounced at the age of five or six weeks. It is prevented in all but the two to three pound premature infants by the administration of casein hydrolysate, and therefore it would appear to be due to insufficient protein in the feeding. If it is pronounced, the infants become lethargic and slow to feed. A blood transfusion readily restores the infant to his usual vigour.

Late Anæmia.

Late anæmia occurs after the age of six months and is due to deficiency of iron. It is prevented by the routine administration of iron, which is therefore begun at the age of one to three months. Iron often proves irritating to these infants and may cause vomiting, colic, constipation, diarrhoea or even specks of blood in the stool. In such cases the dosage should be reduced and then very cautiously increased.

Umbilical Hernia.

Umbilical hernia is a familiar condition in the "ex-premature". It responds to strapping in the great majority of cases.

"Ping-Pong Skull."

"Ping-pong skull", in which the skull-bone indents with finger pressure, is usually seen in infants aged about three months. It is not due to rickets, but occurs in rapidly growing premature infants of very small birth weight, and is due to the inadequate stores of calcium in the fetal skeleton. It is felt in the bones in the vicinity of the posterior fontanelle.

Megacephalus.

Megacephalus is a benign condition in which the head, though looking disproportionately large in comparison with the trunk, is found to be increasing normally in circumference.

Hydrocephalus.

Hydrocephalus may be encountered, and is evidenced by the abnormally rapid increase in the size of the skull.

Retrolental Fibroplasia.

Retrolental fibroplasia, first described by Terry (1942, 1943), is unfortunately encountered. The symptoms become clinically obvious at about three to four months of age, when the infant exhibits nystagmus and a white mass is visible behind the lens. It is found to occur more

commonly in the very premature infants, those weighing under two and three-quarter pounds and of under twenty-eight weeks' gestation running the greatest risk. It is usually bilateral, though it may be more pronounced in one eye than in the other. In severe cases it produces blindness.

Nervous Instability.

Nervous instability may be due to the preferential treatment often accorded the prematurely-born infant.

Spasticity, Mental Defect, and other Central Nervous System Defects.

Spasticity, mental defect and other central nervous system defects may be encountered, and depend on the cause of the prematurity rather than on the prematurity *per se*. It is the obstetric calamities—for example, *placenta previa*, toxæmia, accidental hemorrhage, premature separation of the placenta, *et cetera*—which determine the pre-

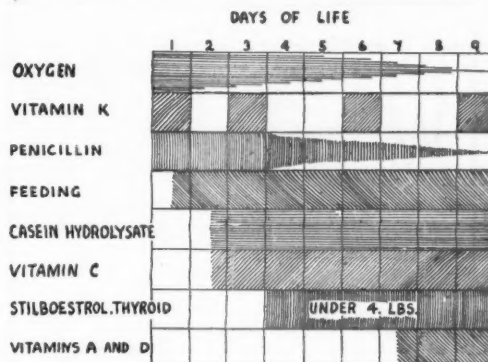


FIGURE IV.

Summary of routine care of premature babies.

mature birth, and which cause the intrauterine anoxæmia to which the cerebral spoiling is due. Such cerebral symptoms would occur in an infant of any gestation, premature or full-time; but since they occur more often in premature than in full-time births, they are encountered more frequently in premature infants.

SUMMARY.

Appended is a summary in graphic form of the routine care of the premature infant.

CONCLUSION.

In conclusion, it is apparent that adequate care of these infants demands close observation and accurate attention to detail. There is, perhaps, no field of paediatrics in which conscientious work is so adequately rewarded.

ADDENDUM.

Preventive measures against retrolental fibroplasia are suggested. W. C. and E. U. Owens (1948) give 150 milligrammes of α -tocopherol daily from the first day and withhold vitamin A and iron. Mary Crosse (Birmingham) attributes it to prolonged use of oxygen.

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STATISTICAL AND PUBLIC HEALTH ASPECTS OF PREMATUREITY.¹

By BARBARA MEREDITH,

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THE Committee of Inquiry into the Medical Aspects of the Decline of the Birthrate, in a report to the National Health and Medical Research Council, made the following statement:

The Committee believes that prematurity is the most important single cause of neo-natal deaths and to a lesser degree of still births. It deplores the complacent attitude adopted in some quarters towards the problem of prematurity.

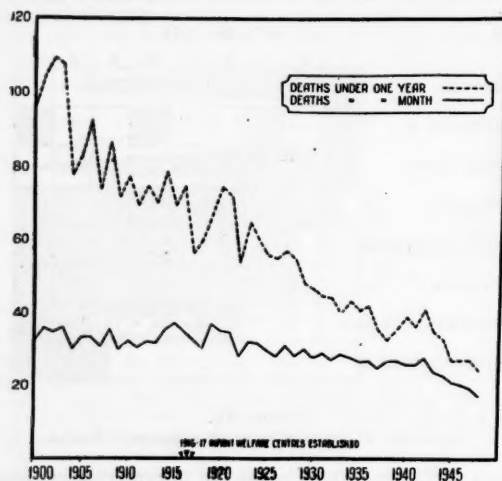


FIGURE I.

Dr. Catherine P. Scholfield, in her report to the National Health and Medical Research Council, used the following words:

In Australia for the year 1940, of 3,222 infants who died in the neo-natal period, the deaths of 1,477 or 45.8% were directly attributable to prematurity.

Further information was requested by the Commonwealth from various State health departments; in Victoria

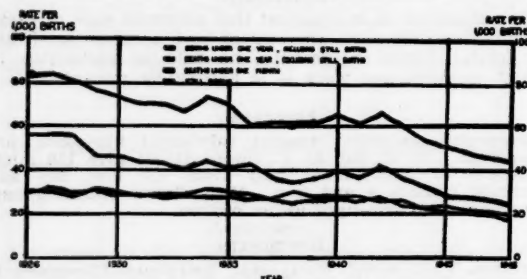


FIGURE II.

this was obtained from vital statistics, from the records of the Women's Hospital, Queen Victoria Hospital and the Children's Hospital, from a questionnaire sent out by the Department of Health through the Hospitals Commission, and by personal inspection by Dr. Norma Kelso, of the Department of Health, of facilities provided for premature babies at 25 metropolitan maternity hospitals.

¹ Read at a meeting of the Victorian Branch of the British Medical Association, on September 7, 1949.

You will all realize the difficulty of obtaining accurate data, as prematurity is not notifiable and standards are not uniform. The "notice of birth" forms ask for information with regard to prematurity, but are often incorrectly filled in. The department would appreciate any help that those engaged in active practice could give in this regard.

Moreover, prematurity cannot be discussed without reference to still births and, as you are aware, Victoria does not register still births, but some information can be obtained from cemetery records.

In Victoria in 1948 the infantile mortality rate was 23.93 per 1000, 17.1 per 1000 of these deaths being due to natal and neonatal causes, and 7.6 per 1000 or 44% of neonatal deaths being due to prematurity. (Figures I, II and III, also Tables I, II and III.)

Victorian figures may be compared with figures given in the statistical review of the Registrar-General for

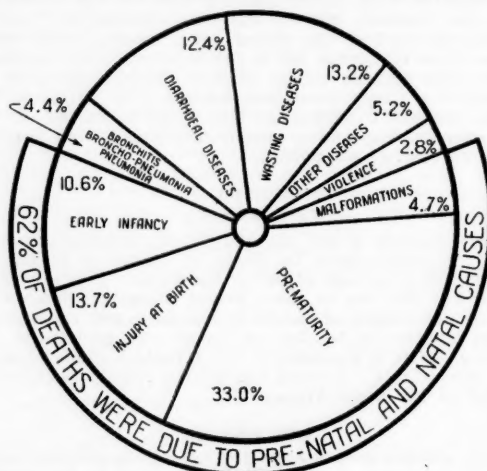


FIGURE III.

England and Wales, 1938 to 1945. England's neonatal deaths due to prematurity in 1945, were 10.45 per 1000 plus 50% still births; the infantile death rate associated with immaturity was thus 24 per 1000, compared with 17 per 1000 for Victoria (Table V).

Incidence of Prematurity.

According to the British Ministry of Health's report, statistics for hospitals show an incidence of prematurity between 6% and 18% of the total number of births as

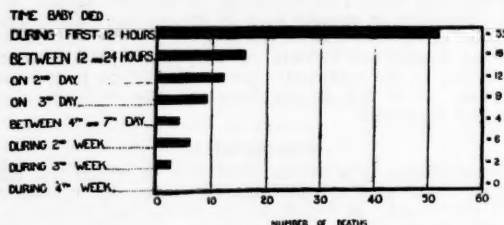


FIGURE IV.

more patients with abnormalities are admitted to hospital. Crosse's figures for Birmingham were 6.3% of the total births, live and still. At the Aberdeen Maternity Hospital (1941-1942 inclusive), the incidence of prematurity was 13.4%, 8.8% among "booked" patients and 39.4% among "unbooked" patients. At the Women's Hospital, Crown Street, Sydney (1945-1946), the incidence of prematurity was 9.05%, 7.96% among "booked" patients and 28.8% among "unbooked" patients. (This information is taken

TABLE I.
Victoria—Infantile Death Rates from Various Causes, 1891-1945.

Causes of Death.	Deaths under One Year per 1000 Births.						
	1891-1893.	1901-1910.	1911-1920.	1921-1930.	1943.	1944.	1945.
Epidemic, endemic and infectious diseases	12.41	7.31	4.87	3.57	2.22	1.12	0.97
Bronchitis, bronchopneumonia, pneumonia	11.37	18.13	6.86	6.08	4.90	3.09	3.45
Diarrhoeal diseases	29.66	24.62	16.13	9.85	2.07	1.49	0.90
Congenital malformations	3.45	4.86	4.38	4.43	4.06	4.20	3.54
Congenital debility	22.24	12.74	13.09	6.77	1.20	0.97	0.53
Prematurity	13.13	14.99	15.17	15.34	10.71	10.65	9.61
Injury at birth				2.57	3.20	3.02	3.45
Early infancy	21.51	12.77	7.98	3.42	4.22	3.56	3.28
Other diseases				4.42	2.30	2.11	1.55
Violence	3.16	2.47	1.07	0.80	0.79	0.76	0.15
Total	116.93	87.89	69.55	57.25	35.76	31.96	28.03

from the report of the Committee of Inquiry into Medical Aspects of the Decline of the Birth Rate, 1948.)

The incidence of prematurity has been shown by investigations of Baird of Aberdeen to vary with social conditions. It has not been possible to obtain figures with regard to this; but Table VI shows the incidence of prematurity at the Women's Hospital, Melbourne, and in Table VII the incidence in industrial suburbs such as South Melbourne is compared with the incidence in Camberwell, a good residential area, but little information is given.

Ætiology of Prematurity.

The cause of prematurity is usually said to be demonstrable in 50% of cases. Toxæmia, ante-partum hæmorrhage, multiple pregnancy (Tables IX, X and XI) and fetal malformation are the most frequent causes.

Danger of Immaturity.

As we all know, premature babies are very liable to injury during birth, and should this be avoided they have many other handicaps to surmount—for example, asphyxia, pulmonary atelectasis and pneumonia, difficulty in maintaining body temperature and difficulty in ingestion of food.

Apart from the very small babies who are too immature to survive, causes of death of these infants are birth injury, asphyxia and, after the first week, infection.

Table VIII shows the post-mortem findings for premature babies. (See also Figure IV.)

Prognosis.

The chances of survival of the premature baby depend largely on his degree of prematurity (best assessed on the period of gestation and his weight) and on the facilities available for his care.

Approximately two-thirds of the deaths among prematurely-born children occur within forty-eight hours of birth, and mostly among infants very light in weight.

Mortality Rate Among Premature Infants.

The British Ministry of Health's report states that hospital records show that the mortality rate among premature infants varies between 100 and 350 per 1000; this is contrasted with the death rate among mature infants of seven to 25 per 1000. (Tables XIVa and XIVb, also Figure V.)

Facilities Available.

In a survey of local conditions, 25 metropolitan maternity hospitals were inspected.

The Nursery.

In the majority of cases no separate nursery is provided; frequently there is no air-lock.

TABLE II.
Neonatal Mortality Rates for Premature and Full-time Infants.
(After V. M. Crosse, "The Premature Baby".)

Hospital.	Number of Live Births.	Premature Births per 100 Births.	Neonatal Mortality Rate.		
			Premature Babies (per 1000 Premature Live Births).	Full-time Babies (per 1000 Full-time Births).	Total.
Edinburgh: Maternity 1939-1940	4,886	9.1	314.0	21.8	48.3
Aberdeen: Maternity 1941-1942	3,156	11.1	301.0	18.9	60.2
Sorrento: Maternity (booked) 1931-1946	14,440	8.0	134.9	14.6	24.1

TABLE III.
Statistics on Prematurity, The Women's Hospital, Melbourne.

Year.	Total Deliveries.	Full-time Infants.					Premature Infants.					Neonatal Deaths.
		Ante-natal.	Emerg-ency.	Alive.	Still-birth.	Dead.	Ante-natal.	Emerg-ency.	Alive.	Still-birth.	Dead.	
1945	3655	2818	514	3193	110	39	113	138	112	61	68	107
1946	4056	3227	595	3687	114	31	96	138	126	38	60	90
1947	5509	4481	637	4981	106	31	221	170	254	64	73	104
1948	5251	4270	553	4823	102	38	157	68	225	61	72	110
1949	5484	—	—	—	—	—	300		—	—	51	101

The room for premature infants usually opens off the general nursery or changing room—at the Children's Hospital it opens off a "sick" ward. In two cases we were told that the premature babies were kept by the fire in the nurses' dining room.

Separate nurseries were usually extremely small, and heating and humidity control meagre.

The premature infants are usually kept near whatever heat is provided—central heating, radiator or gas fire—in the general nursery. In one hospital the general nursery is a converted scullery opening off the kitchen, with its door beside the kitchen range. This hospital sends most of its premature infants away; when it does not they are kept in the general nursery or dining-room.

Most nurseries have a dry-bulb thermometer on the wall. Very few have a wet bulb thermometer. Humidity is provided by bowls of water or damp towels on the radiator. Some depend on the fact that the nursery is the changing

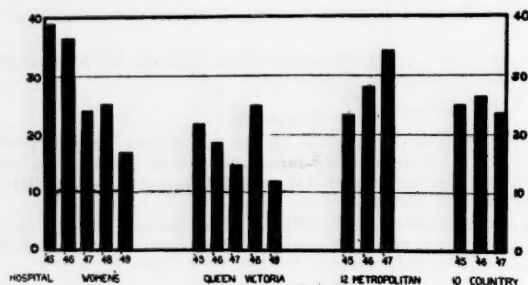


FIGURE V.

room, and has a tap and basin which are frequently in use. Some depend on the steam from the adjacent sterilizer room or food room.

Cribs.

In most hospitals the ordinary wire cribs are used with a lining of cotton wool and sheeting or blanket. Several hospitals have a few lined dress baskets which they use in a lined wire crib—these are for extra small premature babies.

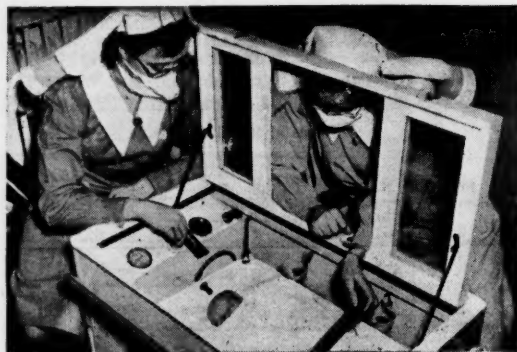


FIGURE VI.

Six hospitals have one or more special electrically heated cribs, usually of the Macguire type with automatic control (cost £60). The Queen Victoria Hospital has a "Humidicrib" (cost £345).

When ordinary cribs are used they are heated by hot-water bags, or, as in two cases, by hot-water tins which line the crib.

Nursing.

At the Queen Victoria Hospital, the Women's Hospital and the Children's Hospital separate staff is kept for

premature babies. At all other hospitals the general nursery staff cares for the premature babies. Several matrons said that the sister in charge of the general nursery made the premature babies her special charge.

All hospitals stressed the difficulty of nursing these babies, as they required such constant care. Staff shortage was mentioned, and continually changing staff due to the forty-hour week.

Transport.

At the time of this survey no hospitals had any special transport, and if a transfer was to be made to the Women's Hospital, the Children's Hospital or Queen Victoria Hospital, or to a mothercraft home, the baby was usually kept for twelve hours and then sent in by taxi or ambulance in a warmed crib.

TABLE IV.

Statistics on Prematurity, The Queen Victoria Hospital, Melbourne, July 1, 1948, to June 30, 1949; 2699 Deliveries, 2735 Infants Born.

Observation.	Full-term Infants.	Premature Infants.	Previa Infants.	Total.
Number of infants born	2559 (93.57%)	162 (5.92%)	14 (0.51%)	2735
Neonatal deaths ..	17 (38.63%)	19 (43.19%)	8 (18.18%)	44 ¹
Stillbirths	28 (50.92%)	21 (38.18%)	6 (10.9%)	55 ²

¹ 1.66% of the total of 2699 deliveries.

² 2.04% of the total of 2699 deliveries.

TABLE V.

Year.	Neonatal Deaths per 1000 Live Births.	Prematurity.	Deaths Due to Prematurity per 1000 Live Births. ¹	Rate, Including 50% Stillbirths Associated with Immaturity. ¹
England and Wales:				
1938	17.572	8.984 (over 50%)	14.47	33
1945	16.910	7.116	10.4	24
Victoria:				
1938	750	339	10.06	26
1948	790	350	7.59	17

¹ Ministry of Health Report, Number 94, 1949.

TABLE VI.

Incidence of Prematurity at The Women's Hospital, Melbourne.

Year.	Total Births.	Premature Births.	Premature Births per Hundred Live Births.
1945	3583	251	7.03
1946	4056	234	5.77
1947	5509	391	7.1
1948	5048	225	4.46

Sisters at the public hospitals said that transporting the babies even under the best conditions seemed to have an adverse effect on them.

Remarks.

In general, accommodation for premature babies is very poor, especially when their susceptibility to infection is considered. They are usually kept in the general nursery, and in most hospitals these are small, overcrowded and unsuitable rooms. The nursing staffs seldom wear masks or gowns, and facilities for the nurses to wash their hands in the nurseries are poor or non-existent.

Country Hospitals.

From replies received from 28 country hospitals, it is evident that conditions are much the same as in the metropolitan area, except that wood fires are often used for heating purposes. Staffing is more difficult and there are fewer automatically heated cribs.

After-Care of Premature Babies.

Babies are not discharged from the public hospitals until they weigh six pounds. The mothers are encouraged to express the breast-milk and bring it to the hospital, or to go there and feed the baby.

TABLE VII.
Incidence of Prematurity in South Melbourne and Camberwell.¹

Year.	Rate of Prematurity per 100 Births.	
	South Melbourne (Industrial Suburb.)	Camberwell.
1940	3.53	3.35
1941	3.31	(6 months) 6.23
1942	6.95	3.89
1943	6.42	3.16
1944	6.49	1.95
1945	5.16	5.28
1946	5.89	7.12
1947	5.37	4.89
1948	4.75	2.30

¹ Source: birth notification papers from city councils.

TABLE VIII.
Cause of Death, Verified by Autopsy, in 47 Consecutive Cases (Queen Victoria Hospital).

Condition.	Number of Cases.
Atelectasis	22
Intracranial hemorrhage	13
Congenital abnormality	3
Cerebral oedema	2
Pneumonia	2
Hæmorrhagic disease of the newborn	2
Fetal erythroblastosis	1
Umbilical sepsis	1
Congenital syphilis	1
Total	47

TABLE IX.
Etiology of Prematurity: Aberdeen, 289 Deliveries.
(Source: Baird, 1943.)

Cause.	Number of Cases.
Preeclampsia	102
Twin pregnancy	102
Gross fetal deformity	20
Accidental hemorrhage	20
Miscellaneous causes	18
Syphilis	12
Placenta prævia	10
Heart disease	9
Pyelitis	5

The Queen Victoria Hospital and the Women's Hospital have follow-up clinics, and most hospitals refer babies to the local infant welfare centres.

Maternity hospitals which do not keep their premature babies transfer them to the Queen Victoria Hospital, the Women's Hospital, the Children's Hospital or one of the mothercraft homes. The first two hospitals mentioned take premature babies if beds are not being used by their own patients. The Children's Hospital has accommodation for five premature babies.

Infant Welfare Training Schools and Mothercraft Homes.

In Melbourne there are four infant welfare training schools and six mothercraft homes, in Geelong there is one mothercraft home. Three schools train both infant welfare sisters and mothercraft nurses. Only infant welfare sisters are trained in feeding premature babies by gavage *et cetera*, but the mothercraft nurse is taught the care of delicate babies during her training.

TABLE X.
Etiology of Prematurity: The Women's Hospital, Melbourne, 1946; 346 Cases.

Cause.	Number of Premature Infants.
Multiple births (30 twins, 3 triplets) ..	33
Maternal causes (toxæmia 133, placenta prævia 27, pyelitis 8, other causes 11) ..	179
Possible fetal causes (erythroblastosis 1, other causes 4)	10

TABLE XI.
Etiology of Prematurity: Queen Victoria Hospital, Melbourne, 1946-1947; 114 Cases.

Cause.	Number of Premature Infants.
Multiple births 8 (16 twins)	16
Maternal causes (toxæmia 24, placenta prævia 1, ante-partum hæmorrhage 3, toxic goitre 1, cholelithiasis 1, acute appendicitis 1, epilepsy 1, pyelitis 8) ..	45
Fetal causes (atelectasis 1, abnormalities 1, anencephaly 1)	3

TABLE XII.
Survival of Premature Babies According to Weight.
(Source: Holts and McIntosh, 1949.)

Birth Weight.	Survival Rate.
Approximately two pounds	5%
Two to three pounds	33%
Three to four pounds	75%
Four and a half to five and a half pounds ..	90%

TABLE XIII.
Survival of Premature Babies According to Weight: The Women's Hospital, Melbourne, 1946-1949.

Weight. (Pounds.)	Total Admissions.	Total Deaths.	Mortality Rate.
1.5 to 2.0	10	9	90.0%
2.0 to 2.5	11	3	27.3%
2.5 to 3.0	9	5	55.6%
3.0 to 3.5	27	11	40.8%
3.5 to 4.0	26	5	19.2%
4.0 to 4.5	53	5	9.4%
4.5 to 5.0	59	3	5.1%
5.0 to 5.5	88	5	5.7%
5.5 to 6.0	17	0	—
Total	300	46	15.3%

In all these homes conditions are good. The babies are kept in separate nurseries—one hospital has a nursery with an air-lock. The rooms are heated centrally or with radiators. Humidity is provided by bowls of water. Cribs are wire cots with a lining or inner basket. One home has two special electric cots, and another has one. A separate staff is used for premature babies, and the staff wear gowns and masks.

Conclusion.

The following measures are suggested to provide fuller information on prematurity, to lower its incidence and to decrease the mortality rate:

1. Adoption of the recommendations of the National Health and Medical Research Council. These are as follows: (i) that registration of still births should be compulsory in Federal Territories and in each State; (ii) that certificates of registration of still births and of infant deaths under one month should state (a) the birth weight, (b) whether a post-mortem examination was performed, (c) whether the cause of death stated is that

TABLE XIVA.
Prematurity.

Years.	Total Deliveries.	Premature Births.	Deaths.	Death Rate per 100 Live Births.
<i>The Women's Hospital.</i>				
1945	3655	173	68	39.3
1946	4056	164	60	36.6
1947	5500	313	73	22.9
1948	5251	286	72	25.2
1949	5484	300	51	17.0

Queen Victoria Hospital.

1945	1299	96	20	21.04
1946	1500	169	31	18.3
1947	2593	134	20	14.9
1948	2363	134	33	24.6
1949	2735	162	19	11.7

12 Metropolitan Hospitals.

1945	—	769	177	23.02
1946	—	736	204	27.71
1947	—	801	272	33.95

28 Country Hospitals.

1945	—	183	46	25.1
1946	—	217	57	26.2
1947	—	208	49	24.03

TABLE XIVB.
Prematurity.

Period.	Number of Premature Babies Admitted.	Number of Deaths.	Death Rate. (Percentage.)
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The Children's Hospital.¹

1946-1948 ..	149	70	46.9
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Mothercraft Homes.¹

1946-1948 ..	112	14	12.5
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¹ Patients admitted to the Children's Hospital include sick premature infants; only healthy babies are admitted to mothercraft homes.

assumed by clinical diagnosis, or is the result of post-mortem pathological examination. The council further makes the following recommendations, in order to obtain comparable statistics relating to infant mortality: (i) That a minimum standard within the definition of prematurity should be adopted, the weight of two pounds 12 ounces (1250 grammes) being used as the index of the lower limit of prematurity. (ii) That statistics be compiled with the use of the following classification: (a) below two pounds 12 ounces—non-viable infants; (b) two pounds 12 ounces to five pounds eight ounces—premature infants; (c) five pounds eight ounces—mature infants. (iii) That statistics relating to infants dying in the first week of the neonatal period be considered separately

from the remainder of neonatal deaths, so as to enable still births and deaths in the first week of the neonatal period to be classified as due to prenatal causes. (iv) That notification of premature births to the Health Department in each State be made compulsory.

2. Preventive measures with regard to incidence. These would include social measures, educational measures, early and regular ante-natal care, and the cooperation of the British Medical Association. Social measures may be summed up as follows: (i) economic security, (ii) more and better homes, (iii) more help for mothers, home help, mothercraft nurses, kindergartens, crèches, labour-saving devices, home deliveries of food. Among educational measures may be mentioned lessons in mothercraft, diet and hygiene in schools. Early and regular ante-natal care would provide for medical supervision and treatment and for the education of mothers in diet, hygiene, breast-feeding *et cetera*. Greater use could be made of the general advice available at all infant welfare centres, and more municipal ante-natal supervision clinics might be set up.

3. Measures for the reduction of the mortality rate among premature infants. These would include (i) early and uniform notification of premature births; (ii) improved obstetric training and practice; (iii) improved standards for maternity hospitals; (a) wards and equipment, (b) infant welfare sisters in charge of nurseries, (c) instructions to hospitals on the care of premature infants; (iv) improved transport.

PREMATURE LABOUR.¹

By DONALD F. LAWSON,
Melbourne.

THE problem of premature birth is one of the most important fields of investigation remaining in preventive medicine. It is estimated that a baby born prematurely has ten times as many chances of dying as does a baby born at full term. The solution of this problem holds out tremendous prospects for the mass saving of human life, so its importance needs no emphasis.

In a considerable number of the cases in which labour begins before full term, the reason is obvious. The factors which are involved in these cases may be grouped under three main headings: (i) disorders due to pregnancy—for example, toxæmia, ante-partum hæmorrhage, multiple pregnancy; (ii) disorders incidental to the pregnancy—for example, hypertension, diabetes, anæmia; (iii) intercurrent infections—for example, pneumonia, pyelitis of pregnancy.

However, these obvious reasons for the onset or for the induction of premature labour, account for only about half of all cases of prematurity. There is no conclusive evidence as to the aetiology of the remaining 50%, but there is a good deal of circumstantial, and we feel quite logical, evidence as to the cause, and this evidence should give us a guide as to what is desirable in the conduct of our ante-natal work.

Good ante-natal care means that the patient is induced to lead a life which is a judicious combination of adequate rest and adequate activity, and that she is persuaded to eat an adequate diet. It is this last point which is probably the most important of all. A great deal of work and investigation has been done to try to assess correctly the importance of diet in pregnancy. Baird of Aberdeen, the experiments in Toronto, and the work of the People's League of Health in London, all produce evidence which whilst not conclusive is very suggestive of the fact that an adequate diet will reduce the incidence not only of premature labour, but also of the factors such as toxæmia which make a premature labour necessary in the interests of the mother. The instruction which has so often been given in the past, and which is still so often given, that

¹ Read at a meeting of the Victorian Branch of the British Medical Association, on September 7, 1949.

the intake of red meats must be reduced in pregnancy, must be discontinued. More and more the emphasis is on the importance of a high protein intake in the diet.

Along with this advice, which should be given repeatedly and emphatically, is advice as to the desirability of adequate weight control in pregnancy. We should aim to have patients weighing not more than one and a half to two stone above their normal weight at the end of the pregnancy. If a patient begins her pregnancy underweight or overweight, this fact should be taken into consideration in assessing what is considered to be the correct weight at the end of the pregnancy. A weight gain which is difficult to control despite the full cooperation of the patient is often indicative of impending toxæmia or of multiple pregnancy; the latter condition carries with it a considerable risk of both toxæmia and premature labour.

There is reason to hope that in certain conditions in which toxæmia can reasonably be anticipated, the use of large doses of diethylstilbæstrol, as advocated by Smith and Smith, will either avert the toxæmia or delay its onset, and so permit the birth of a more mature child. It is good obstetrics to diagnose multiple pregnancy early and use the stilbæstrol in these cases, too, for the purpose of reducing toxæmia, and to delay the onset of labour. It is considered wise, for the same reasons, to give large doses of stilbæstrol to all patients with hypertension or diabetes who become pregnant.

The conservative approach to the problem that *placenta prævia* presents, emphasized originally by Macafee, is one that has increased considerably the fetal salvage rate in this serious obstetric complication. The principles enunciated by Macafee are those now generally applied in Melbourne.

In the third group, that of the intercurrent infections, on general principles it can be said that if the patient has made her life the judicious combination of rest and activity that we consider desirable, that if her diet has been really adequate, and that if her hæmoglobin value is at a suitably high level, the prospects of intercurrent infection will be at the absolute minimum.

Some psychiatrists insist upon the importance of nervous causes of the onset of premature labour. The state which for want of a more scientific name we could call nervous tension, is one which in my own experience I must conceive as a possible factor in a small number of premature births. This means that, as well as performing the routine physical tests at each ante-natal visit, we must at least listen to the patient's stories of difficulties arising out of housing and domestic problems. Often we can do little about them, but patients are relieved to find a sympathetic listener to whom they can confide their anxieties.

However, despite our best efforts, patients do come into premature labour or need induction of labour prematurely. How can we best deal with them? We have recently had made available in Melbourne a premature baby ambulance. This has done some most useful work; but that should not blind us to the fact that nothing is a better transporter of premature babies than the mother's uterus. If the patient is booked for her confinement in a hospital which has not both the staff and the facilities necessary for the care of the premature infant, it is best to transfer the patient to an institution that has these facilities. Often this will mean that the doctor will have to send the mother to one of the public hospitals. This is a circumstance about which neither the mother nor the doctor may be particularly happy, because by this stage of the pregnancy the patient and her attendant have acquired a mutual interest in each other. However, often by losing the "case" we gain the baby.

Other points of importance can be summarized briefly as follows.

1. A premature infant runs the maximum risk of damage when it is born by the breech, and in so far as we do not know which particular patient will come into labour prematurely, always attempt external version whenever a breech presentation is diagnosed.

2. Reduce analgesia and anæsthesia to an absolute minimum. Premature babies are particularly sensitive to depressant drugs, and all the sedatives used in labour can

be reasonably so labelled. If in the ante-natal period the normality of the process of labour has been impressed upon the patient, it is easier for her to see her labour through with this minimum of sedation.

3. Give the mother vitamin K. This may help to reduce the risk of the cerebral hæmorrhage to which the premature baby is so particularly liable.

4. Do not hesitate to perform an episiotomy if the perineum is in the slightest degree rigid. Patients do not expect stitches after a tiny baby, but reduction of the strain on the fetal skull by means of an episiotomy is a further means of reducing the risks of cerebral hæmorrhage.

When the premature baby is finally born, the things that are really vital to it are warmth, oxygen, a clear airway and a minimum of handling. The means by which these things can be obtained should be ready and waiting for the infant's arrival.

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TWELVE MONTHS' PSYCHIATRY IN NORTH QUEENSLAND.

By A. S. ELLIS, M.B., B.S., D.P.M.,
Consultant Psychiatrist to Townsville Hospital
and to Cairns Hospital.

THIS paper describes twelve months' extramural psychiatry in an area hitherto devoid of all psychiatric facilities. The practice combines private work with appointments as part-time consultant at two general hospitals.

Local Conditions.

Townsville is a city with a population of approximately 35,000, situated on the north-eastern coast of Queensland on latitude about 19° south. The climate is tropical, with a wet season lasting from November to March. A very wide area is served, extending from Cooktown in the north to Mackay in the south and Mount Isa in the west. The population in this area is about 100,000. The nearest town of comparable size is Cairns, 200 miles north, and an appointment as consultant psychiatrist is also held at the hospital there. Brisbane, the State capital, is 800 miles south.

The main industry is a large meatworks. Cattle from the hinterland are slaughtered there, and loaded on to ships for the south and overseas. Sugar, minerals, fish and fruit are also exported from here, and the town is the main seaport for the north. The population is thus largely of the working class, although many banks and business concerns have their northern headquarters here.

The population of the area is mixed. There is a large Italian element on the canefields, and many Chinese storekeepers are in the towns. There are also groups of Germans, Finns, Balts and Greeks.

Air and rail transport are extensively used. The road to the south is bad. Several air liners a day connect with Brisbane, five flying hours away, and the north and west are also served to a less extent by air. The train takes two nights and a day to reach Brisbane.

General Medical Facilities.

In Townsville there are eleven general practitioners, three specialists, and a staff of five at the general hospital. The two private hospitals take approximately 60 patients between them.

The specialists are an orthopaedic surgeon, an ophthalmologist and a psychiatrist, who are paid on a sessional basis by the local hospital board. They also have the right of private practice and have private beds allotted to them in the general hospital.

The orthopaedic surgeon and the psychiatrist go by air to Cairns once a fortnight and hold clinics at the hospital there, as well as giving consultations to private patients.

Apart from Cairns, the other towns in the area are one, two- or three-man towns with small district hospitals. Patients from these towns who need specialist attention must visit Townsville or Cairns, or else travel the 800 miles to Brisbane.

Psychiatric Facilities.

The nearest mental hospital is one of 1200 beds in Brisbane. In March, 1948, the local hospital board in Townsville took over from the State Department of Mental Hygiene the building now used as a psychiatric clinic. This building had been used as a reception house since 1880, and "mental" patients had staged there on their way south. No treatment was given. This building is in the process of being renovated according to modern psychiatric concepts, and there is accommodation for twelve in-patients, with provision for out-patients. There is one padded room.

The clinic is staffed by and administered from the general hospital, but psychiatric patients are also treated in other wards of the hospital. The short experience with psychoneurotics and mild psychotics bears out Sands's findings (1948) that "... some schizophrenics, certain manic-depressives and so forth, (may) be treated in the open general hospital ward".

The psychiatric clinic is a ward of the general hospital, and every effort is made to induce the local population to realize that mental disorder is an illness no more disreputable than physical ailments.

Hopelessly demented or deteriorated patients have to be admitted in emergencies. These patients are usually certified later and taken under police escort by rail to the mental hospital in Brisbane; but a rule is made that certification must be done by general practitioners, not by the psychiatrist.

Restless or noisy patients are at present accommodated in the old "cells" at the general hospital, about a quarter of a mile away from the psychiatric clinic. With the sedatives now available, restless episodes are usually rapidly controlled, and the patient comes to the psychiatric ward in a calmer frame of mind.

In accordance with the policy of treating psychiatric disorder as an "ordinary" illness, restraint is hardly ever used in the psychiatric ward, and patients are allowed the maximum freedom consistent with safety. Most of them walk in the public gardens next to the clinic, and those who are able to do so swim and play tennis during their period of convalescence.

Treatment.

All the usual physical methods of treatment except continuous narcosis and leucotomy are employed.

Convulsive Therapy.

Convulsive therapy is given to in-patients and out-patients. An account of the technique used with out-patients may be of interest.

The case is discussed with relatives, who are informed of the usual risks and complications. Considerable stress is laid on this, because until twelve months ago electric convulsion therapy was unknown in this area. Either the patient or a responsible relative then signs a form of permission for treatment. (This also applies to full coma insulin therapy.) X-ray films of the chest are taken as a routine measure. The blood urea content is not estimated, but blood pressure readings are taken, and the fundi are examined for retinal arteriosclerosis.

The responsible relative is given capsules of "Sodium Amytal", with instructions to administer one to the patient

about half an hour before the patient reports for treatment, and the importance of the patient's coming without breakfast is explained and stressed.

The patient usually comes to the treatment room slightly confused and sleepy from the premedication, and treatment is given in the usual way. Manual restraint only is used, and this can be carried out effectively by a sister (controlling the jaw and mouth-gag) and two nurses.

The whole procedure is carried out with as little fuss as possible, because the patient accepts the treatment at the apparent (emotional) value placed upon it by the doctor and staff. After the initial anxiety of the patient has been overcome, no further attempts are made at reassurance. The staff is instructed not to use the term "shock" or "convulsion" in the inevitable discussion with the patient that follows treatment, and in this connexion it is preferred that the term "Cerletti" or "electric treatment" be used.

Great care is taken that no patient sees or hears another receiving treatment. After recovery, the patient has a cup of tea and returns home with his escort.

When out-patients are dealt with in this individual and unemotional way, most of the resistance to the treatment is overcome. No patient has refused to complete the course, and two who relapsed returned voluntarily, requesting further similar treatment.

Electroconvulsive therapy is given only to depressives (or in those anxiety cases in which depression is the outstanding feature), to manics, or as a preliminary or supplement to insulin therapy. It has been also occasionally used for paraphrenics exhibiting mood-swings; but under no circumstances is it used for frank anxiety states, nor is it used as a substitute for full coma insulin therapy in schizophrenia.

We are not yet in a position to use curare as an anti-convulsant.

Insulin Therapy.

Insulin therapy in full and sub-coma doses and in appetitive doses is used, the indications and technique following traditional lines.

"Pentothal" and Ether Abreactions.

"Pentothal" and ether abreaction therapy is given to in-patients or out-patients as the occasion arises.

Psychotherapy.

Almost any conversation with a psychiatric patient can be termed "psychotherapy"; but "depth" psychotherapy is almost completely out of the question here. The main difficulties in this form of treatment are, of course, the time factor, and the fact that the patient intelligent enough to cooperate and to realize the implications of the treatment is rare.

Such psychotherapy as is carried out follows the lines laid down by Alexander (1948) and other advocates of "brief" psychotherapy. This treatment is fairly superficial, but seems to enable patients to carry on at about 75% efficiency.

An attempt at psychotherapy along these lines is also made with patients receiving full coma insulin therapy. My impression is that patients receiving electroconvulsive therapy do not benefit much from active psychotherapy, and that this treatment is, or may easily become, dangerous to a depressive patient.

Ancillary Services.

A part-time, non-qualified occupational therapist works at the psychiatric clinic, and the hospital board is trying to get a full-time qualified therapist. It is not yet possible to grade occupational therapy satisfactorily, and although occupational therapy is regarded as indispensable in psychiatric treatment, I am not convinced that the present arrangement does more than pay lip-service to this concept.

¹ For the idea of the use of this euphemism I am indebted to Dr. MacKeith, superintendent of Napsbury Hospital, England.

The State Government is arranging for a psychologist to visit this area every three months.

There is a Red Cross social worker in the town. This officer cooperates well with the clinic, but is limited by the terms of her appointment to dealing with ex-service personnel. We are trying to get a full-time social worker for North Queensland, to deal with the many civilian patients needing assistance.

Vocational guidance officials from the Commonwealth Employment Service visit the area two or three times a year, but confine their attention mainly to children of school-leaving age. The Government recognizes that many others require vocational guidance, and plans are being considered to set up a full-time vocational guidance service in the north.

Of 246 patients examined privately, 187 were directly referred from general practitioners. The hospital patients, 282 in number, were all referred to the psychiatric department by resident medical officers.

The area served is indicated in the accompanying sketch map (Figure I).

By far the greatest number of patients were suffering from various types of anxiety state. Those conditions accounted for 127 of the private cases and 120 of the hospital cases.

The next commonest conditions were schizophrenic reaction-types (including "process" schizophrenia and paraphrenia), epilepsy, organic reaction-types, and congenital mental defect, in that order. The first three of these conditions seemed almost equally distributed between

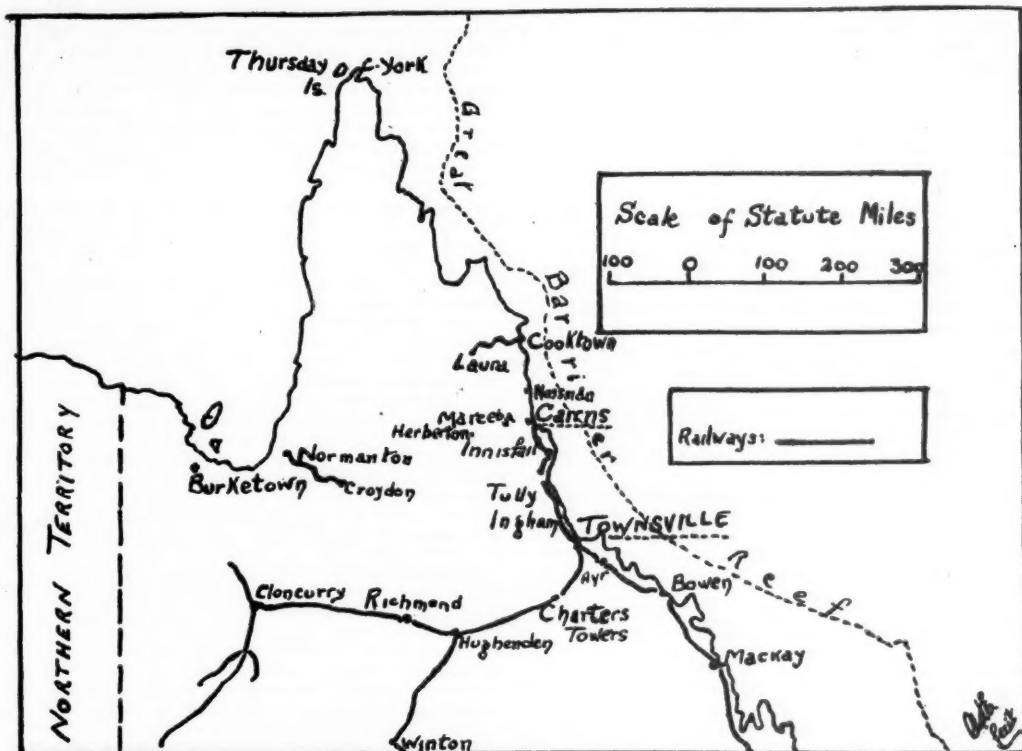


FIGURE I.
Sketch map of North Queensland, showing area served from Townsville and Cairns.

"O.P. Group."

A group of ex-patients, out-patients and relatives has been organized, rather along the lines of Sandison's (1948) "O.P. group". The group meets fortnightly, under the aegis of a local minister of religion, a business man, and the psychiatrist. Its activities are mainly social, and emphasis is placed on this aspect rather than on the possible therapeutic value. Lectures and discussions are held, not necessarily on topics of psychiatric interest. Group members form a valuable nucleus for propaganda about the importance of early treatment in nervous cases, and also help to spread the idea of the "respectability" of this type of illness as opposed to the older ideas of rejecting psychiatric disabilities.

Summary of Cases.

The cases encountered during the period under review provide a "mixed bag" of psychiatric entities; but because of the present subjective trend of nosology, detailed classification would be of little general interest.

private and public hospital patients, but mental defect was nearly twice as common among the hospital population as in the higher-income group.

About 10% of psychiatric in-patients were classified as chronic alcoholics, but my impression is that alcoholism *per se* is not so important as other types of social maladjustment, typified by broken homes due to infidelity, "incompatibility", "in-law trouble", and constant minor bickerings due to young married couples being forced to live with parents. Loneliness is also a noticeable feature, many patients spending long days at home alone, making no effort at any social contact outside their immediate family. (I do not refer here to those with severe depression, rather do these people live a solitary, mildly unhappy, pointless sort of existence.) It was in an attempt to combat this that the "O.P. group" referred to above was formed; but I would not claim that it is fulfilling its object. When one of these patients is admitted to hospital and made to feel one of a useful group, the change in outlook is often dramatic, but it usually does not last when she returns home.

General Considerations.

Some of the difficulties in this type of practice are similar to those experienced by Sirkin (1949), particularly with regard to the cautious approach needed to paranoics in a small community, the necessity for absolute discretion in a town where "everyone knows everyone else's business", and the gradual wearing-down of prejudices against psychiatry in general. I am more favourably placed than Sirkin, however, in that I have active backing from the State Government, and have held hospital appointments from the beginning.

The principles laid down by Jones (1949) (never to refuse to speak to interested groups on mental hygiene, always to cooperate in community projects, to identify oneself closely with the local medical profession, and to select for treatment patients likely to show rapid benefit) came to be adopted spontaneously, and we learned by experience the correctness of his dictum that "... the psychiatrist must not be too perfectionistic". The out-patient group already referred to was started about six months after practice was commenced, and Sandison's and Jones's articles were not received until some time later.

It was interesting to note, therefore, that in the breaking of new ground in Australia, similar problems were met in the same way as by contemporaries in England and the United States.

In this community there is no convalescent home where patients may stay for one or two weeks before returning to their daily routine after leaving hospital. The nearest approach to this is an arrangement recently made with the landlady of a local boarding-house to take one or two discharged patients. In this atmosphere it is possible to begin some sort of psychological rehabilitation.

Another difficulty is the lack of psychiatric assistance. The nearest psychiatric colleague is 800 miles away; consultations are therefore impossible, and responsibilities have to be taken alone that would in other circumstances be shared. The lack of ordinary discussion with other psychiatrists is also a factor which tends to make one dogmatic when discussing cases.

The long distances are to some extent minimized by the use of air travel; but the day and a half per fortnight spent in Cairns is time that can be ill afforded from the cases in Townsville. Nevertheless, it is important that these trips be made.

Conclusion.

There is a wide field of usefulness for a psychiatrist practising extramurally in a country area. The main disadvantages are personal ones—the enforced isolation from cultural centres, the lack of contact with other practitioners in one's own specialty, and the fact that one has to be a psychiatric "jack-of-all-trades" with, one fears, the corresponding corollary.

One expects (and meets) more prejudice and apathy in a country area than in the cities; but this is common to psychiatrists anywhere, and a protective armour is rapidly developed. It is ridiculous to expect one psychiatrist to serve such a vast area adequately; but with the greater number of graduates becoming interested in psychiatry, it is hoped that it will not be long before the advantages of country specializing will be sufficiently obvious to lure younger men from the increasingly strenuous life of the crowded cities.

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TRAUMATIC PSYCHONEUROSIS.

By PAUL G. DANE,
Melbourne.

WHEN the 1914-1918 war was unleashed upon the world, none realized what would be the result of high velocity explosives, of massed attacks under a murderous barrage of fire, or of months of unrelenting bombardment in trench warfare upon the human mind. Perhaps only a few men of that time even thought of or contemplated the disintegrating effects that modern warfare would have upon the human being; none really knew the pathology, let alone the treatment, of the ordinary traumatic neurosis of peace time.

One, the almost lonely genius in Vienna with his small band of students, had been making studies of peace-time neurosis; but his work up till that time had scarcely influenced psychopathology, let alone psychiatry in general. It was hardly known outside his immediate circle—this in spite of the fact that he had actually been invited to the United States of America in 1909 by Professor Stanley Hall to give a course of lectures at Clark University, Worcester, Massachusetts. These lectures did influence the thought of a few psychiatrists there, notably W. A. White and A. A. Brill.

In Australia our first introduction to Freud's teachings was given by no less a person than the distinguished English author and physician, Dr. Havelock Ellis. The late Dr. Havelock Ellis read a paper to the Section of Psychiatry and Neurology at the seventh Australian Medical Congress held in Sydney in 1911. In the course of that address Dr. Ellis said, in regard to Freud's work, "there can be no doubt that that work demands careful study, that we can no longer afford to pass it by with contemptuous indifference", and again, "it will probably be found that Freud possessed the magic hand of genius revivifying all that he touches and furnishing a new stimulus to investigation for which we can never be too grateful". But even more remarkable, Professor Sigmund Freud himself contributed a short paper to that same congress by invitation of the secretary of the section. In that paper his mighty intellect condensed his theories in a masterly manner into what he himself called "these few sentences".

At the beginning of the century, or shortly afterwards, the early ideas of Freud had been formulated and published, and in these publications were contained a working hypothesis of the psychopathology of hysteria and traumatic neurosis, which—had the medical profession only recognized, studied and taught it—would have saved enormous suffering, tremendous waste of money and much foolish and futile speculation upon the cause and treatment of the traumatic neurosis.

Alas! The medical profession opposed Freud's views, and even now many of its members still do so; it thus must bear the blame for a complete lack of understanding of the effects of battle stress upon the human personality. In 1914 this was culpable enough; but what measure of condemnation must be pronounced upon us here in Australia, when a like ignorance was still in existence upon the outbreak of the second world war? The medical personnel of the army and psychiatrists in general were unprepared for proper evaluation of the possible psychiatric casualties of the war just then beginning, although there was not the slightest reason for this unpreparedness. However, the psychiatric casualties of that awful first world conflict, estimated at one-third of all the casualties, had forced some medical men in the United States of America and in England to realize how little they really knew about the pathology and treatment of psychoneurotic disorders.

But even with the urgency of the problem and the increasing numbers of psychiatrically disordered personnel, the recognition that these disorders were real, that they were serious problems and that their causation and treatment were psychological came very slowly; in fact even now the great majority of psychiatrists have no clear and accurate knowledge of the war neuroses, their causes, pathology and treatment.

During the last twenty-eight years psychology has made extraordinary advances, owing chiefly to the fundamental work of Freud, and also to a lesser extent to that of many of his followers: and psychiatry as a separate discipline has become more and more orientated to the fundamental theories of psychoanalysis. This is at least true of psychiatry in the United States of America and in England and to a lesser extent in Holland and France. But one cannot say that such is the truth about psychiatry in this country—indeed, there is very little evidence that psychoanalysis has influenced extramural psychiatry and still less than it has influenced intramural psychiatry in Australia.

There are 33 mental hospitals in Australia, employing about 97 psychiatrists, and there is not in all these institutions one properly trained psychoanalyst. It is probably also even true to say that in not one hospital is there any treatment that could be even remotely called analytical. This is a deplorable state of affairs; but the situation is even more deplorable when one realizes that psychoanalysis is by some derided and scoffed at as a method of treatment.

It is difficult to realize that there is only one institution in the whole of Australia where patients can receive treatment by psychoanalysis or where medical practitioners can be trained in psychoanalysis; however, there are in Sydney and Adelaide psychiatrists trained as psychoanalysts who are devoting themselves to the treatment of psychoneurosis by this, the only rational scientific method.

It is difficult to say exactly why our psychiatrists have been so backward in the study of psychoanalysis and so lacking in enthusiasm for personal analysis; but I feel certain that the advent of modern so-called shock methods of treatment has been responsible to a very large extent for the apathy towards psychoanalysis. The human mind finds it difficult to believe in mind and will always tend towards a materialistic explanation and a physical doctrine, even when paying a certain lip service to psychology. Thus shock treatment satisfies that ever-present tendency towards the materialistic which even religious belief has not been altogether successful in dispelling, whilst at the same time it provides a short-time therapy that also satisfies the sadistic hunger of its devotees. These reflections are prompted and inspired by my experience in repatriation hospitals during the last seven years.

It was with considerable surprise and misgiving that during 1940 and the following years soldiers and ex-soldiers were encountered in the psychiatric service of repatriation hospitals who had been treated for various psychoneurotic states by means of shock, without any attempt at psychotherapy having been made. These patients had of course in many instances relapsed, and their second state was worse than their first state. Naturally it is granted that there may have been others treated by shock who made some kind of recovery; but they must have been few, seeing that these shock patients are in the year 1949 still numerous and still as neurotic as ever. But one's surprise and misgivings were turned to utter amazement when one encountered patients with genuine traumatic neurosis—men who had been through periods of almost unbelievable terror and stress, men with the typical shell shock of the 1914-1918 war—who had been treated by shock, not one dose but two doses and three doses. Whatever may be said in criticism of the treatment of hysteria and anxiety states by shock—and I consider such treatment utterly wrong—I can only say that to treat a traumatic neurosis by shock methods is entirely unjustifiable and betrays an ignorance of psychopathology so profound that a like ignorance exhibited by a physician or surgeon in his sphere would soon lead to ruin in his practice. There is absolutely no justification for psychiatrists to be ignorant of the pathology and treatment of the traumatic neurosis, and the real war neuroses are true traumatic neuroses.

Freud in his very earliest writing (1895 and 1896) gave a lucid exposition of the psychic mechanisms involved in traumatic neurosis and indicated the appropriate treatment. His theories, founded largely upon the epoch-making work of Josef Breuer, provided a sure foundation for the understanding of all psychoneurosis; but it is seldom recognized that the same can be said of the

traumatic neurosis. His theories, formulated in his early contributions, have of course been extended, modified and elaborated by himself and others in many contributions.

The war neuroses were dealt with briefly but fairly comprehensively in a collection of essays by various psychoanalysts published in 1925. In 1925 I myself wrote a short account of war neurosis to THE MEDICAL JOURNAL OF AUSTRALIA. During this last war the most notable contributions upon war neurosis in soldiers were made by Grinker and Kardner, but neither of these authors explains so clearly the psychopathology of the traumatic neurosis as Freud had done in his very earliest works published about 1895.

A study of these various contributions should be the prerequisite of all psychiatrists who have to deal with the treatment of neurotic soldiers. Such study, with the observation of ex-soldiers suffering from shell shock and traumatic neurosis, should be sufficient to convince any serious student of the subject that treatment of these patients by means of shock is useless and unjustifiable.

The essential nature of traumatic neurosis can be easily comprehended if one understands the following Freudian concepts. (i) All ideas, memories and percepts have an affective or feeling component. (ii) This affective tone or affect varies not only with the idea, percept *et cetera*, but also with the quantity of time in which the idea, percept *et cetera* is presented to the psychic apparatus. (iii) Affects disturb the energy charge in the psyche. (iv) Affects seek appropriate discharge along motor pathways in either form or behaviour (fright, fight, weeping or speech—swearing, shouting *et cetera*). (v) If circumstances are such as to prevent an appropriate discharge, then psychic energy is required to control and repress the affect, which remains as a disturbing centre in the unconscious, separated from its appropriate idea *et cetera* and ever seeking discharge—an amnesia for the traumatic event has occurred. These are the traumatic memories of Freud's earliest ideas, and until they are brought into consciousness again and united to their appropriate ideas *et cetera* they remain as pathological sores in the psyche, producing all the well-known symptoms—headache, irritability, frightful dreams, lack of concentration, disturbances in sexual libido *et cetera*.

The only rational treatment for such disorders is to restore to consciousness the lost memory and allow an appropriate motor reaction for the affect. This is called abreaction. Abreaction can be produced by classic psychoanalysis, by recall under hypnosis or the intravenous administration of barbiturates or at times by simple persuasion and encouragement, but not by electric shock or insulin. The method that gives the most dramatic result is undoubtedly recall under hypnosis. "Pentothal" should be resorted to only for those patients who are not hypnotizable. Sometimes all or any of these methods fail—as do therapeutic endeavours in any realm of sickness. A soldier—or civilian for that matter—suffering from a traumatic neurosis, who is successfully treated by one of the methods of abreaction, shows an improvement so dramatic in its intensity and its depth as to be really amazing. Even if complete cures are not effected, great improvement often results, enabling the patient to rehabilitate himself by his own inherent recuperative powers over a period of time; his ego gains in strength if his environment becomes safe and favourable in other ways.

I do not in this paper intend to discuss the full psychopathology of the effect of psychological trauma; such a discussion will appear in another paper.

I trust that this short article will do something to arouse psychiatrists who are treating traumatic neurosis in ex-soldiers in Australia to a true appreciation of the nature of the disorder and its appropriate treatment.

In conclusion, it is hardly necessary to emphasize that the sooner after the traumatic impact treatment by abreaction and recall is instituted, the greater the chance for full recovery. Since the advent of the electro-magnetic wire recorder we have made records of some patients' reactions during the recall of the traumatic events. This has made possible the actual demonstration of the whole procedure.

Reports of Cases.

HAZARDS OF TREATMENT: ACUTE MENINGITIS DUE TO *HÆMOPHILUS INFLUENZÆ* TYPE B IN AN INFANT.

By BRYAN DOWD,

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Sydney.

Clinical Record.

J.W., AN INFANT GIRL, had survived pertussis when six months old: thereafter she had been well until April 15, 1949, when, at the age of thirteen months, she became drowsy and feverish, vomited and passed several fluid stools. Despite home nursing in a country town and the treatment set out in Table I, the illness persisted, so that one week later her admission to the district hospital was arranged.

Lumbar puncture, performed there on April 29, because of the occurrence of neck stiffness, revealed macroscopically clear cerebro-spinal fluid under apparently normal pressure. The fluid was reported later to be sterile and the findings to be not suggestive of meningitis. However, the clinical

TABLE I.

Date.	Sulphadiazine. (Oral Administration.)	Penicillin. (Intramuscular Administration.)	Streptomycin. (Intramuscular Administration.)
15.4.49 to	Commenced and suspended because of vomiting.	—	—
19.4.49	Dosage unknown.	—	—
19.4.49	Recommended and resumed.	—	—
22.4.49	—	300,000 units in oil.	—
23.4.49	—	100,000 units in saline eight-hourly for three days.	—
26.4.49	—	100,000 units six- hourly.	—
28.4.49	Doses of 0.5 gramme four-hourly for three doses.	100,000 units six- hourly continued.	—
29.4.49	—	100,000 units six- hourly continued.	50,000 units three-hourly.
3.5.49	—	100,000 units six- hourly continued.	Suspended.

evidence of such an infection was so strong that a provisional diagnosis of influenza meningitis was made, and intramuscular streptomycin therapy was combined with penicillin therapy from April 29 until May 3.

A summary is given of the chemotherapy employed in this initial phase until the child's transfer to the Royal Alexandra Hospital for Children, Sydney (Table I).

It is noteworthy that no continuous sulphadiazine therapy was able to be employed, nor was any intrathecal treatment attempted; but high-dosage intramuscular penicillin and streptomycin therapy was given for five days prior to the transfer.

On May 4, in Sydney, further lumbar puncture produced turbid cerebro-spinal fluid with the following characteristics: the cell content was 388 per cubic millimetre, 90% being polymorphonuclear cells and 10% mononuclear cells; the protein content was 80 milligrammes per centum, the chloride content 670 milligrammes per centum and the glucose content greater than 20 milligrammes per centum; culture of the fluid yielded a moderate growth of *Hæmophilus influenzae* type B.

The clinical diagnosis of acute influenza meningitis was confirmed.

The following treatment, which had become a custom, was commenced.

1. Sulphadiazine was given orally in a dose of three grains per pound per day (a total of 4.5 grammes per day).

2. Streptomycin was given both intramuscularly and intrathecally. (a) Intramuscularly 20,000 units per pound per day were given—a total of 500,000 units given in two injections at an interval of twelve hours. (b) Intrathecally, 50,000 units per day were given in five millilitres of physiological saline.

3. *Hæmophilus influenzae* type B rabbit antiserum was given intramuscularly, 90 millilitres being given in three injections of 30 millilitres at intervals of six hours.

4. A transfusion of 120 millilitres of blood was given on May 5.

Clinical progress seemed satisfactory, but daily examination of the cerebro-spinal fluid, after an initial failure of culture on May 5, showed the unwelcome presence of the causative organism (see Table II).

The streptomycin concentration of the cerebro-spinal fluid on May 11 was estimated at 16 to 32 units per millilitre, but the sensitivity of the organism to streptomycin had gradually decreased (see Table III).

It was clear before May 11 that the resistance of the organism to streptomycin had far outgrown the concentration of the drug obtainable in the cerebro-spinal fluid. Streptomycin therapy was abandoned by May 17.

Treatment used in this disease prior to the advent of streptomycin was reinvoiced on May 11, as follows.

1. Penicillin was given: (a) intramuscularly, 50,000 units every three hours; (b) intrathecally, 20,000 units every twelve hours, the dose being increased to 40,000 units every twelve hours on May 13.

2. Sulphadiazine therapy was continued as before.

3. A further 60 millilitres of antiserum and 250 millilitres of blood were given.

Clinical and laboratory response was evident for eleven days.

Penicillin concentrations varying from one to two units per millilitre to 16 to 32 units per millilitre were obtained in the cerebro-spinal fluid over this period.

Because the child seemed clinically well and the cerebro-spinal fluid was sterile, the administration of penicillin by both routes was suspended on May 23. The sulphadiazine dosage was reduced to 1.5 grammes per day on the following day.

The temperature was persistently elevated thereafter, neck stiffness increased, and there was occasional vomiting. In the blood-soiled cerebro-spinal fluid obtained on May 19 there had been only 91 leucocytes (and 85% of these

TABLE II.

Date.	Cells.			Protein. (Milligrammes per Centum.)	Chloride. (Milligrammes per Centum.)	Glucose. (Milligrammes per Centum.)	Cultural Findings.
	Total per Cubic Millimetre.	Polymor- pho- nuclear Leucocytes. (Per Centum.)	Mononuclear Cells. (Per Centum.)				
5.5.49	—	—	—	—	—	—	No growth.
6.5.49	—	—	—	—	—	—	Light growth.
7.5.49	—	—	—	—	—	—	Light growth.
8.5.49	—	—	—	—	—	—	Light growth.
9.5.49	507	20	80	120	660	<20	Moderate growth.
10.5.49	—	—	—	—	—	—	Profuse growth.
11.5.49	146	45	55	100	670	<20	Moderate growth.

mononuclear cells); but the protein concentration had been elevated, the chloride concentration had been as low as 660 milligrammes *per centum*, and the amount of glucose present had been less than 20 milligrammes *per centum*.

The suspension of one chemotherapeutic agent and the reduction of the other at this time resulted in the reappearance of the organism in the cerebro-spinal fluid on May 25. The fluid on that day contained 596 cells per cubic millimetre, 80% being polymorphonuclear leucocytes and 20% mononuclear leucocytes. The protein, chloride and glucose contents in milligrammes *per centum* were respectively 160, 680 and less than 20; culture produced a moderate growth of *Hæmophilus influenzae* type B.

TABLE III.

Date.	Streptomycin Sensitivity. (Units per Millilitre.)
4.5.49	1 to 2
9.5.49	50 to 100
10.5.49	250 to 500
11.5.49	>50,000

Another beginning was made.

1. Sulphadiazine was given orally in doses of 3-0 grammes per day.

2. Penicillin was given (a) intramuscularly (50,000 units every three hours) and (b) intrathecally (100,000 units per day, decreased to 40,000 units every twelve hours on May 28).

3. A further 30 millilitres of antiserum and 250 millilitres of blood were given.

Time was taken to review past failures and mistakes. The progress to date had been disappointing, the treatment unsatisfactory. The child was ill and the outlook bad. Recurrence of infection in the face of what had been considered established and adequate treatment in the past seemed, at the time, to warrant trial of another antibiotic.

Aureomycin therapy was commenced by mouth on May 26 and continued until June 16, in divided doses at intervals of eight hours to a total of 50 milligrammes per kilogram per day. Concentrations of approximately 0.6 unit per millilitre to 1.2 units per millilitre were obtained in the cerebro-spinal fluid. However, the sensitivity of the organism to aureomycin was estimated at approximately 2.0 units per millilitre. This was in accord with the literature available (Bryer *et alii*, 1948). Reported tissue irritation following parenteral administration of the drug seemed to preclude its intrathecal use. Any beneficial effect which it may have produced must have been largely extrathecal.

The response as a whole was none the less gradual and good.

On June 16 penicillin administration by both routes and aureomycin therapy were suspended. Sulphadiazine therapy was continued at reduced dosage (1.5 grammes per day) until June 28, when all chemotherapy ceased. The cerebro-spinal fluid on June 29 was almost normal. Clinical recovery during the period was uneventful, and the child is now alert and without demonstrable abnormality.

Discussion.

The purpose of this report is not to show something new, nor is it intended to deny the place of streptomycin in the treatment of this disease. It serves to illustrate known facts and hazards, to emphasize lessons learnt.

The chief points of interest are as follows:

1. The difficulties of diagnosis and treatment of acute meningitis in infancy in country areas.

2. The hazards of insufficient therapy uncontrolled by constant laboratory studies, especially bacteriological. Particular stress may here be laid on the necessity for culture of the cerebro-spinal fluid after each lumbar puncture whenever streptomycin is used intrathecally, and for the estimation of the streptomycin sensitivity of the organism whenever a growth is obtained.

3. The failure of suppression of the causative organism even by high-dosage extrathecal administration of penicillin and streptomycin, and the necessity for sufficient intrathecal therapy.

4. The development of streptomycin resistance *in vivo* on the part of *Hæmophilus influenzae* type B over a period of one week, despite treatment by the intrathecal route.

5. The hazard of recurrence of infection due to premature withdrawal of powerful antibiotic weapons.

6. The use of a new antibiotic (aureomycin), whose place in the treatment of this type of meningitis cannot be assessed, but would seem to be very small.

The changes in the cerebro-spinal fluid were also noteworthy.

A remarkable cellular response from May 11 to May 12 (*vide infra*) followed two intrathecal injections of 20,000 units (two millilitres) of pure crystalline penicillin G, with a twelve-hour interval: the leucocyte content of the cerebro-spinal fluid rose to 3400 per cubic millimetre, 70% being polymorphonuclear leucocytes and 30% mononuclear cells. A comparable response took place from May 25 to 26 following a single intrathecal injection of 100,000 units (five millilitres) of the same preparation in twenty-four hours: the leucocyte content of the cerebro-spinal fluid rose to 3670 per cubic millimetre, 85% being polymorphonuclear leucocytes and 15% mononuclear cells.

If both responses were purely irritative in character, five millilitres of the concentrated solution (20,000 units per millilitre) might have been expected to produce a much more pronounced effect than was seen. In point of fact, the difference was less than 300 leucocytes per cubic millimetre. Moreover, the rapid fall in the number

TABLE IV.

Date.	Cells.			Protein. (Milligrammes per Centum.)	Chloride. (Milligrammes per Centum.)	Glucose. (Milligrammes per Centum.)	Cultural Findings.
	Total per Cubic Millimetre.	Polymorphonuclear Leucocytes. (Per Centum.)	Mononuclear Cells. (Per Centum.)				
12.5.49	3400	70	30	100	660	<20	No growth.
13.5.49	1660	70	30	140	660	<20	No growth.
14.5.49	339	30	70	100	—	—	No growth.
15.5.49 ¹	—	—	—	—	—	—	No growth.
16.5.49	141	20	80	130	660	>20	No growth.
17.5.49	56	20	80	130	660	>20	No growth.
18.5.49 ²	—	—	—	—	—	—	No growth.
19.5.49 ²	91	15	85	200	660	<20	No growth.
20.5.49 ²	—	—	—	—	—	—	No growth.
21.5.49 ²	—	—	—	—	—	—	No growth.
23.5.49 ²	—	—	—	—	—	—	No growth.

¹ Specimen blood-soiled.

² Specimen contained 18,700 erythrocytes per cubic millimetre.

TABLE V.

Date.	Cells.			Protein. (Milligrammes per Centum.)	Chloride. (Milligrammes per Centum.)	Glucose. (Milligrammes per Centum.)	Cultural Findings.
	Total per Cubic Millimetre.	Polymor- pho- nuclear Leucocytes. (Per Centum.)	Mononuclear Cells. (Per Centum.)				
26.5.49	3670	85	15	160	650	> 20	No growth.
27.5.49	1236	80	20	120	650	> 20	No growth.
28.5.49	39	50	50	100	630	> 20	No growth.
31.5.49	31	30	70	100	690	> 20	No growth.
1.6.49	50	20	80	100	720	> 20	No growth.
8.6.49	324	75	25	90	715	> 20	No growth.
15.6.49	32	10	90	50	735	> 20	No growth.
29.6.49	10	10	90	30	740	> 20	No growth.

of cells during the following two or three days, despite continuance of the same therapy on each occasion, suggests no irritative cause for the response. It might be argued that the penicillin concentration of each of the injections producing the first response (10,000 units per millilitre) is itself irritative, but no similar pleocytosis has been encountered by us over a large series of patients similarly treated in this hospital. Was the cellular reaction perhaps "defensive"?

The necessity for twelve-hourly intrathecal injections of penicillin in the therapy of this disease has already been stressed (Williams, 1948). It is as well to remark in this place that, although a single injection of 100,000 units of penicillin was given every day for three days, and although no grave clinical manifestation of harm was observed, this procedure is not considered suitable for the average case. Here it was employed with some trepidation to lessen handling during a period of great illness.

The interesting failure of the cerebro-spinal fluid chloride concentration to rise to normal values during the whole time of severe illness from May 4 until June 1, closely paralleled the clinical picture. In a search of the cerebro-spinal fluid characters for some clue as to when treatment might have been safely reduced or suspended—even in the presence of a series of attempts at culture producing no growth of the organism—this fraction, of all the quantitative analyses performed, seemed to us of most value in this case. Is it indeed a useful prognostic guide? What is its real significance?

The vagaries of the qualitative glucose test carried out are vitiated by the fact that the test is qualitative. Alexander and Leidy (1949) have again recently noted a reciprocal relationship between the quantitative glucose concentration and the bacterial population of the cerebro-spinal fluid.

Looking at the whole story in retrospect and giving to aureomycin what weight is due, one is left half believing that if the tried remedies had been used with more discretion and not withdrawn precipitately on May 23, the immediate outcome might have been the same with one less recurrence, one less hazard.

Certainly, I now believe that no part of the chemotherapy should have been altered prior to the full examination of a specimen of cerebro-spinal fluid not soiled with blood. I wonder if more attention should be paid to the total chloride and glucose concentration (quantitatively estimated).

Summary.

The remarkable recovery of an infant girl from an otherwise mortal illness is shown. This was due to the eventual solution of difficult problems posed by circumstances, some of which should, some of which could not, have been foreseen—and these occurring within and without a large city hospital.

Acknowledgements.

I wish to thank Dr. Stephen E. Williams for his commentary on the bacteriology, and on the cerebro-spinal fluid changes in general; Dr. Lorimer Dods and Dr. Kathleen Winning for their help and advice in the care

of this child; and the resident medical staff of the Royal Alexandra Hospital for Children, Sydney, for the closest cooperation.

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- Alexander, H. E., and Leidy, G. (1949), "Mode of Action of Streptomycin on *Haemophilus Influenzae* Type B: III. Nature of Streptomycin Action on Sensitive *H. Influenzae*", *Pediatrics*, March, page 277.
 Bryer, M. S., Schoenbach, E. B., Chandler, C. A., Bliss, E. A., and Long, P. H. (1948), "Aureomycin, Experimental and Clinical Investigations", *The Journal of the American Medical Association*, September 11, page 117.
 Williams, S. (1948), "Some Observations on the Role of Penicillin in the Treatment of *Haemophilus Influenzae* Meningitis", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, page 463.

Reviews.

TEXT-BOOK OF OPHTHALMOLOGY.

No publication has been awaited with greater interest by the English-speaking world of ophthalmology than the fourth volume of "Duke-Elder".¹ Although he had originally intended it to be the final volume of his "Text-Book of Ophthalmology", Sir W. Stewart Duke-Elder has confined himself to a discussion on the neurology of vision, and motor and optical anomalies, leaving ocular adnexa and injuries and operative surgery to Volumes VI and VII.

The high standard set by the preceding parts of the work is maintained and surpassed. It is difficult to believe that the book was written by an oculist with a large consulting practice, actively engaged in research, and constantly travelling abroad as the guest of foreign ophthalmological societies. The child of Duke-Elder's vision and energy could not be imprisoned within the stuffy pages of a text-book, and it has long been recognized as the standard English encyclopedia of ophthalmology.

The introductory section on the neurology of vision when taken in conjunction with the final section of the preceding volume, covers the subject in a way that leaves little to be desired. It is unfortunate that diseases of the optic nerve were included in Volume III. Nevertheless, the neurologist will find it worth while to possess both volumes for these sections alone.

Returning to the more narrow limits of ophthalmology, the author devotes over three hundred pages to motor anomalies of the eye. Here the style is that of the encyclopaedist, and not of the teacher. Duke-Elder appears to be not at all sure of his ground, and to be as bewildered by the variety of conflicting opinions as is the reader by the multitude of instruments depicted for the investigation of the vagaries of binocular vision. It would seem, for instance, that almost in despair he strikes his colours in the battle between the superior and inferior oblique, and gives no reason for the faith that is in him. One feels that in discussing the amblyoscope, his remarks to the effect that "A multitude of different types have been evolved, many of them possessing particular virtues, but most of them

¹ "Text-Book of Ophthalmology", by Sir W. Stewart Duke-Elder, K.C.V.O., M.A., D.Sc. (St. And.), Ph.D. (Lond.), M.D., Ch.B., F.R.C.S., Hon. D.Sc. (Northwestern), Volume IV.; 1949: *The Neurology of Vision; Motor and Optical Anomalies*. London: Henry Kimpton. 9½" x 6½", pp. 1184, with 1080 illustrations, some of them coloured. Price: £3 10s.

indicative of individual ingenuity rather than born of necessity", might well refer to the whole field of squint.

The volume concludes with a comprehensive account of the anomalies of refraction. The chapter on anisometropia could have been omitted, and a stronger stand taken on the necessity for common sense in the guidance of the myope. The tolerance of the author is shown by his reference to the writings of Aldous Huxley on the value of eye exercises. It is obvious that his aim is to present as much information as possible to the reader and to leave the final judgement to him.

Like its predecessors, this volume is more than a work of reference. Every page reflects the dynamic personality of the author, with his thirst for knowledge never to be quenched. It will long remain a source of inspiration to the ophthalmologist overburdened with the routine cares of practice, unless, indeed, he be like Gallio who "cared for none of these things".

DIGESTIVE DISORDERS.

"HANDBOOK OF DIGESTIVE DISEASES", by John L. Kantor and Anthony M. Kasich, is an excellent survey of modern thought on these conditions for the practitioner and student.¹ It is well illustrated with diagrams, pathological specimens and X-ray photographs.

The authors apparently do not altogether agree with James A. Brussel in his survey of the psychiatric basis of certain digestive disorders—which may be found in a separate section at the back of the book—as the psychiatric basis is not much emphasized when these diseases are discussed individually.

The omissions are very few, but some mention might have been made of Behcet's syndrome in its relation to digestive function. Also, no mention is made of Heller's operation for achalasia of the colon, which is a satisfactory procedure when adequately carried out.

In the discussion on hepatitis, little emphasis has been laid on the vascular and cytolytic basis for liver necrosis, and it is considered that this fundamental concept, as described by Himsworth, should have received proper attention.

In the section on colitis, the pharmacological innervation of the large intestine is incorrectly presented, the parasympathetic in this region being sensitive to curare, and not to atropine.

Apart from these minor defects, the book makes very interesting reading to anyone wishing to brush up modern thought on digestive diseases.

HERNIA.

THERE are 500 pages in "Synopsis of Hernia" by Alfred H. Liason.² Of these 500, 220 are devoted to the inguinal and femoral herniae, 52 to other abdominal herniae, 43 to diaphragmatic herniae and 13 to rare herniae. This is a well-proportioned allotment. The author is obviously a man of wide experience, and his opinions, generally speaking, are sound ones. Unlike the writers of many American books and papers on hernia, the author has a sense of balance in regard to the inguinal hernia. He does not insist on the routine use of large plastic operations for ordinary indirect inguinal herniae. He is well aware of the fact that the only true recurrence after an operation for indirect inguinal hernia is the indirect one, and that the so-called direct recurrence is really due to a faulty operation. In this regard the most important chapter is that towards the end of the book on recurrent herniae. It is suggested that the matter in this chapter might well be moved to the front of the book and made to serve as an introduction to the study of the inguinal herniae.

There are, however, certain criticisms of the book. It cannot be said that the writer is a master of the art of summarizing. In a summary everything should be clean-cut and crystal clear. We find in the book, however, certain inconsistencies. The author, for instance, condemns Bassini's

operation, but nevertheless gives a description of the Willys-Andrews operation, and on page 143 shows a diagram where fleshy muscle is being sewn to Poupart's ligament in a way that would cause just as much atrophy as Bassini's method. Again, the author describes the modern standard operation for reducible oblique inguinal hernia, including the repair of the enlarged *annulus inguinalis profundus*. Under the heading of "The Posterior Repair of the Inguinal Canal" it is found that the essential part of the repair has already been described, and the reader is referred back to a previous paragraph. Again a list of complications are given, and there are mixed up together those complications which are common to all operations and those which are peculiar to the hernia operation.

Although the illustrations are excellent, they are not all of them designed, as they should be in a summary, to take the place of words. The opening section on anatomy would be much clearer and better if diagrams were substituted for much of the description. In short the book is very much in need of skilful editing. Nevertheless, it can be thoroughly recommended as a very sound book.

SURGERY: ORTHODOX AND HETERODOX.

In "Surgery: Orthodox and Heterodox" Sir William Heneage Ogilvie has collected some of the less technical addresses which he has had published in the past and "by pruning and rejuvenating them", as he expresses it, has made them into a volume for his friends. There are wisdom, humour and charm in the result, with evidence of a nice feeling for the right word or phrase, into which, unfortunately, jargon like a noisome body obtrudes itself now and then. Probably no one will agree with all the ideas these essays contain; the title would be misleading if they did, for the orthodox always tend to be disturbed by the heterodox and the heterodox to be irked by the orthodox. But there is something for all: for those who would learn, the ripe fruit of experience, which need not be eaten uncritically; for those who care to think, provocative but not lightly considered opinions put forward often with dignified diffidence; for those who would merely be amused, as pleasant reading as any medical man could wish for a dull week-end. The emphasis is on surgery in all its aspects, but the approach and background belong to the whole Hippocratic tradition.

DISEASES OF THE NERVOUS SYSTEM.

F. M. R. WALSH'S text-book "Diseases of the Nervous System" first appeared in September, 1940.³ In July, 1949, the sixth English edition appeared, all but the first of the previous editions having been reprinted. This in itself is evidence of its remarkable qualities, and of the fact that such a book was urgently needed in medical teaching. The work has also been translated into French and Spanish.

The author's philosophic mind, his neurological and physiological training, and his critical faculty determine concentration upon basic realities, exclusion of ephemeral tendencies, and condemnation, if only by lack of presentation, of much that results from the intrusion into medicine of emotional and less worthy judgements. The lucidity has been emphasized in previous reviews. Dr. Walshe is determined that the average student, while attempting to assimilate the great bulk of medicine, will not be discouraged by an illusion of the complexity of neurology which some other presentations of the subject tend to foster. And there is no doubt that he succeeds in this aim.

Certain new matter has been added. This concerns chiefly the use of penicillin in the treatment of nervous diseases (particularly neurosyphilis), and a valuable essay on poliomyelitis has been added. A number of advances in treatment, particularly surgical treatment, are not described, or are merely indicated. However, it is reasonable to recall the qualifying subtitle in the book's full title: "Diseases of the Nervous System, Described for Practitioners and Students". The practitioner will not always learn from studying any book when further aid should be sought for

¹ "Handbook of Digestive Diseases", by John L. Kantor, M.D., F.A.C.P., and Anthony M. Kasich, M.D., F.A.C.P.; Second Edition; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" x 5½", pp. 662, with 149 illustrations. Price: £5 15s. 6d.

² "Synopsis of Hernia", by Alfred H. Liason, M.D.; 1949. New York: Grune and Stratton, Incorporated. 8½" x 5½", pp. 516, with 98 illustrations. Price: \$6.50.

³ "Surgery Orthodox and Heterodox", by Sir William Heneage Ogilvie, K.B.E., D.M., M.Ch., F.R.C.S.; 1948. Oxford: Blackwell Scientific Publications. 8½" x 5½", pp. 256. Price: 12s. 6d.

⁴ "Diseases of the Nervous System: Described for Practitioners and Students", by F. M. R. Walshe, M.D., D.Sc., F.R.S.; Sixth Edition; 1949. Edinburgh: E. and S. Livingston, Limited. 9½" x 6", pp. 380, with 60 illustrations. Price: 17s. 6d.

the patient. However, the attitude may well be defended that no patient should be denied the accuracy which should result from consideration of his problem by one skilled in the field concerned.

It is probable that few medical schools exist in which this book has not become the standard text-book of neurology, and it can unhesitatingly be recommended to every student and to every practitioner who wishes to extend his knowledge and, in particular, to develop an interest in the subject. The book is playing a very important part in medical education, in passing the tradition of the English school of neurology, cradled in the National Hospital, Queen Square, far beyond the confines of that hospital and, indeed, of the shores of England.

AN ATLAS OF AMPUTATIONS.

THE recently published "Atlas of Amputations" by Donald Slocum is a book that presents in an interesting manner a subject usually regarded as of little clinical interest.¹ The book itself is fairly large and complete, the illustrations being of high quality. The reader is taken through the indications for amputation, the preparation for operation, operative technique, and after-care including limb fitting and rehabilitation. One of the most important sections deals with amputation of the fingers and parts of the hand, and here the scope has been rightly widened to include a little reconstructive surgery. In this part particularly, one is impressed with Slocum's desire to leave a stump that will give the best possible function under working conditions.

The only exception one may take to the teaching of this book is in various details where a difference of opinion may quite reasonably occur among surgeons. It is obvious that the author has had an extensive experience in this work, not only in the actual surgical work, but also in fitting the "amputee" with his prosthesis and training him in its use.

In conclusion, it may be said that this is the best book on amputations and may be taken as a guide by all surgeons who are called upon to remove a limb.

Notes on Books, Current Journals and New Appliances.

A TRIBUTE TO A PÆDIATRICIAN.

"GOLDEN JUBILEE WORLD TRIBUTE TO DR. SIDNEY V. HAAS" has been published to commemorate a world-wide tribute paid to a leading American paediatrician on the completion of his fiftieth year of medical practice.² Particular reference is made to Haas's introduction of the banana treatment for celiac disease and to his advocacy of the treatment with atropine of the hypertonic infant. A special committee of doctors and laymen organized the tribute. The book contains a biographical sketch of Haas, a list of his published papers on paediatrics, excerpts from speeches made at a luncheon arranged in his honour, a list of the guests present, excerpts from some of the letters contributed to the Golden Book of Tributes presented at the luncheon and a complete list of those who sent them. It is a most attractively prepared little book.

NUTRITION AND LIFE.

We have been requested by the *Société scientifique d'hygiène alimentaire*, Paris, to announce that the *Bulletin* which it has been publishing since 1940 has been altered in form and presentation, and that since the beginning of 1949 it has appeared under a new title—*L'alimentation et la vie*. Each issue contains original articles (all on the various aspects of one topic), book reviews and notes on current journals.

¹ "An Atlas of Amputations", by Donald B. Slocum, M.D., M.S.; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 11½" x 8½", pp. 584, with 564 illustrations. Price: £10 10s.

² "Golden Jubilee World Tribute to Dr. Sidney V. Haas: In Honor of His Pioneering Contribution to Celiac Therapy and the Treatment of the Hypertonic Infant, and of the Completion of His Fiftieth Year of Medical Practice"; 1949. New York: The Committee for the Golden Jubilee Tribute to Dr. Sidney V. Haas. 9" x 6", pp. 44, with illustrations.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Rationalist Annual for the Year 1950", edited by Frederick Watts. London: Watts and Company. 8½" x 5½", pp. 100. Price: 2s. 6d.

This publication was formerly known as "The Agnostic Annual"; it is in its sixty-seventh year of publication.

"Handbook of Bacteriology: For Students and Practitioners of Medicine", by Joseph W. Bigger, M.D., Sc.D. (Dublin), F.R.C.P. (London), F.R.C.P.I., D.P.H., M.R.I.A.; Sixth Edition; 1949. London: Baillière, Tindall and Cox. 7½" x 5½", pp. 568, with 109 illustrations, some of them coloured. Price: 20s.

An extensively revised edition issued after an interval of ten years.

"Blakiston's New Gould Medical Dictionary"; editors, Harold Wellington Jones, M.D., Norman L. Hoerr, M.D., Arthur Osol, Ph.D.; 1949. Philadelphia and Toronto: The Blakiston Company. Sydney: Angus and Robertson. 9" x 7", pp. 1332, with 252 illustrations. Price: 84s.

A standard dictionary in entirely new form with 80 contributors.

"Nutritional Data", compiled by Harold A. Wooster, junior, and Fred C. Blanck; 1949. Pittsburgh: H. J. Heinz Company. 9" x 7½", pp. 124.

Compiled to present in convenient form the basic principles and facts of nutrition.

"Fundamentals of Otolaryngology: A Textbook of Ear, Nose and Throat Diseases", by Lawrence R. Boies, M.D.; 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" x 6", pp. 468. Price: 61s. 9d.

For the undergraduate and the practitioner who is not a specialist.

"The Surgical Treatment of Facial Injuries", by Varaztad Hovhannes Kazanjian, M.D., D.M.D., and John Marquis Converse, M.D.; 1949. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson. 10" x 7", pp. 586, with 746 illustrations. Price: £5 7s. 6d.

Covers every aspect of treatment of all types of trauma of the face.

"Operations of General Surgery", by Thomas G. Orr, M.D.; Second Edition; 1949. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10½" x 7½", pp. 908, with 1700 illustrations. Price: £6 8s. 3d.

Written "not only for the beginner in surgery, but for the general surgeon as well".

"Vitaminology: The Chemistry and Function of the Vitamins", by Walter H. Eddy, Ph.D.; 1949. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson. 9" x 6½", pp. 380. Price: £3 4s. 6d.

A comprehensive presentation intended for teachers of biochemistry, students and interested medical men.

"The Common Infectious Diseases: A Handbook for Students and Postgraduates", by H. Stanley Banks, M.A., M.D. (Glasgow), F.R.C.P. (London), D.P.H. (Cantab.); 1949. London: Edward Arnold and Company. 8½" x 5½", pp. 368, with 90 illustrations. Price: 21s.

Teaching based on lectures to undergraduate and postgraduate students in infectious diseases.

"The Tuberculous Process: A Conception and a Therapy", by Alfred Leitch, M.B., Ch.B. (Edinburgh); 1949. Bristol: John Wright and Sons, Limited. London: Simpkin Marshall, Limited. 7½" x 5", pp. 188. Price: 12s. 6d.

An independent study of certain aspects of tuberculosis.

The Medical Journal of Australia

SATURDAY, FEBRUARY 25, 1950.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ANIMAL AND PLANT KINSHIP.

In a celebrated lecture delivered in Edinburgh in 1868 T. H. Huxley disclosed his belief that there was one physical basis, substantially the same in structure, chemical action and function in all living things, both plant and animal; this was protoplasm, the main ingredient of which was the colloid protein. We cannot accept today Huxley's dictum that the simplest form of life is a nucleated cell; bacterium, bacteriophage and virus have set the problem further back. Moreover, the unicellular animal as we know it is a product of long evolutionary processes; some of these protozoa can transform chemical potential energy into light with an efficiency surpassing modern engineering efforts; others are able to use in defence and attack chemical poisons or toxins of remarkable complexity and potency. Yet, after all, Huxley's chief contention was right; there is a close affinity in all living matter, an affinity which has presented problems of great difficulty in therapeutics. In the first flush of enthusiasm over antiseptics it was hoped to inhale sterilizing vapours which would cure tuberculosis in the lungs; soon it was realized that what would destroy the bacillus would destroy the lung tissue in which it lived. Similarly, attempts at rendering the human bowel bacteria-free were doomed to disappointment. The aim of the physician in using bactericidal drugs, except in the case of antibodies, is to work in the margin between the therapeutic and lethal doses, and with most mineral, alkaloidal and aromatic agents this margin is distressingly narrow. Perhaps it was Huxley's scientific caution which prevented him from speculating why there should be this physiological intimacy between plant and animal, high and low; he recognized the kinship, but forebore to advance a tentative explanation. It is to be noted that through the ages the differences between the two kingdoms have loomed large, differences which scientific investigation at one time tended to accentuate. Most animals can move, most plants are fixed. All plants with the exception of certain parasites and saprophytes capture solar energy by photosynthesis; animals obtain their supply of energy

in chemical form by robbing the plant. Here it may be remarked that the inability of plants to make use of other impinging energies is quite remarkable; when trees sway in the breeze the forces operating in the lower parts of their trunks are enormous, but they are put to no useful purpose; similarly the massive liberation of energy in wave, tide and torrent has no utility beyond transport. One is tempted to conjecture that vegetable life began in stagnant pools where diffuse sunlight was the only form of energy available. In plants the framework and the walls of cells are composed of polysaccharides, in animals they are protein. The multicellular plant is an extreme form of democracy without any central government; the multicellular animal is an oligarchy with centralized direction over most activities. In animals coordination of action in component parts is effected by rapidly transmitted nerve impulses and by slowly circulating hormones; in plants hormones operate alone. Plants show an enormous range of chemical synthetic powers and build up at constant temperature, pressure and reaction long chains and closed rings, carbohydrates, oils, waxes, aromatic molecules, and vitamins like A, C, D and E, and a host of sterols whose molecular architecture is the wonder of the organic chemist, and all from the carbon dioxide of the air together with water from the roots. Animals, probably through their parasitism, have forfeited this faculty of synthesis and, with the exception of making a few minor molecular changes, are mere assemblers of chemical groups preformed by the plant. It is customary to deny sensation to the vegetable kingdom. One of the aphorisms of Leonardo da Vinci was that pain is given only to animate things which have movement, but we have no right to dogmatize here; for all we know every flower may enjoy the air it breathes. Other differences than those mentioned may be advanced, but making every allowance for these, we must regard the characters common to the two kingdoms as preponderant. "We are of one blood, ye and I" said Mowgli to the snakes, but he might with equal aptness have said it to the flower in the crannied wall. The humblest plant and animal enshrine an unentered Holy of Holies, the central mystery of life, no nearer exploration today than in the time of Aristotle. Each shows that response to environmental change which so fascinated Herbert Spencer that he put it forward as a proximate definition of life itself. Each has the power of reproduction, originally no doubt a fission which allowed the ratio of surface to growing volume to remain fairly constant, but later in both kingdoms employed the extraordinary device of sexual reproduction with its immense possibilities of gene inheritance. Each possesses the capacity of almost unlimited mutational changes upon which natural selection, in the absence of human interference, operates so mercilessly. Above all, the biochemical basis of plant and animal protoplasm is, as T. H. Huxley proclaimed, identical. The man in the street wonders why an extract of yeast should resemble, as an article of diet, an extract of mammalian muscle; but there is after all little ground for this surprise.

Recognizing the extent of overlap, one might naturally expect that plant and animal physiology and pathology should exhibit mutual aid and reinforcement in research. The study of animal physiology has had the immense advantage of a much closer association with human medicine and so has been pursued by a larger number of

investigators and in a larger number of laboratories. The debt of botany to animal biology is considerable, especially in the field of biochemical technique, in micro-analysis, in electrical response, in the study of hormones and in many other directions, but the debt has been well redeemed. Brownian movement which has yielded such important information in the dynamics of molecular collisions was first described by a botanist. Pfeffer drew the attention of the scientific world to the quantitative aspects of osmotic pressure; possibly he has been overpraised in this, for the application of gas laws to solutions was the great achievement of Van't Hoff, the chemist. We must not forget that the laws of inheritance proclaimed by Mendel were obtained on observations made on peas. At the present day the elegant device of chromatography has been taken over from the original botanical source into all sorts of biochemical investigations in animal physiology. That botanical science can be of notable service to human medicine is a safe prophecy. Certain lines of research can be tentatively indicated. One is the role played in the plant by alkaloids which operate so powerfully in the animal body, and special mention may be made here of synergism of action of several components of a plant extract. Most clinicians will agree that in the poppy, foxglove and mycelium of ergot are chemical principles which in each case act synergically on certain animal organs. In pre-Darwinian days this was explained as a disposition of kindly Providence, but today we have moved far from this simple piety. What functions do vitamins perform in the plant where they are elaborated—they are obviously of importance, but just in what direction? In the formation of galls we see an extraordinary cell proliferation arising from something exuded by the larva of the gall fly; in some cases, however, galls may be formed by a dwarfing of natural growth; in the former case the human pathologist would like to know how the gall fly exudate operates, whether by a chemical irritant or by a virus. In this connexion mention should be made of the striking discoveries of botanists regarding the growth-promoting substances which have already been put to practical use in agriculture. That these investigations must soon find a parallel in human physiology one may safely predict. The use of antibiotics is developing at a rapid rate in human and veterinary medicine; we await the botanist's verdict whether the action of these powerful agents is in each case directed specifically against those enemies or competitors which the organism is likely to meet. Finally, botany has given biology in general the illuminating conception of air-borne hormones. We now know that the ripening of fruit can be by their means expedited and observational botanists have described how, after certain tropical plants have formed blossom, all the plants of the same species down wind have burst rapidly into blossom too. A few years ago there appeared in a Russian journal a suggestion that growing plants exhale a hormone which operates beneficially on the human being. If this is correct then a city park is not only an area exempt from air pollution but a definite source of health. Unfortunately the views so given were, like so many Russian pronouncements, unsupported by convincing experiments; still, the idea is attractive, for the possibility of air-borne hormones is for the animal an unexplored field. It is pleasant to note that today the biologists working in both kingdoms

are meeting for discussion, help and criticism in a manner never seen before. Nothing but good can arise from this happy alliance.

Current Comment.

AN INQUIRY ON FAMILY LIMITATION.

FROM Great Britain comes a lengthy report by E. Lewis-Fanning, B.Sc., Ph.D., of an inquiry into family limitation, undertaken for the Royal Commission on Population.¹ The investigation was carried out under the supervision of the Fertility Questionnaire Subcommittee of the Royal College of Obstetricians and Gynaecologists, consisting of ten members; but Sir William Gilliatt, President of the College, states in a foreword that the credit for the work rests almost entirely with Dr. Lewis-Fanning, who is statistician in the Department of Preventive Medicine in the Welsh National School of Medicine, and that he actually wrote the report. The chief questions investigated were the following: (i) How extensively is birth control practised? (ii) In what proportions are the different methods of birth control practised? (iii) Are there important differences between different social groups in the extent of the practice of birth control, or in the choice of method? (iv) To what extent is birth control, as practised, effective? (v) What is the extent of involuntary infertility? (vi) Does the practice of birth control affect the power to reproduce? (vii) How important is abortion as a method of birth prevention? (viii) What is the proportion of "unplanned" pregnancies? (ix) What is the proportion of "unwanted" children? (x) What are the chief reasons given for using birth control? A searching questionnaire was planned and the inquiry was confidential, neither the name of the woman interviewed nor that of the recorder being recorded.

The value of an inquiry such as this clearly depends on whether the women interviewed are a representative sample of the women of the general population. Between August, 1946, and June, 1947, questionnaires numbering 11,078 were completed. Of these 10,297 referred to women whose first marriage, at the time of questioning, had not been terminated by death, separation or divorce, or whose first marriage had lasted for the whole of their reproductive life. The 10,297 women fell into three groups—a non-maternity group of 3281, a maternity group of 5682 and a third group of 1334 comprising general practice contacts, health visitors and so on. For the purpose of answering the questions set out above analysis was confined to the non-maternity group. In our summary of the findings of the inquiry only salient features will be mentioned, and for two reasons—the first that space cannot be given to a full summary, and the second that most of the findings are not other than would be expected. Those who desire fuller information will have to consult the report.

The percentages of women using birth control at some time during married life are set out in a table; the peak (66%) is reached by those married between 1935 and 1939. Between 1940 and 1947 the percentage is 55; between 1910 and 1919 it is 40. In regard to the methods of birth control practised, it was found that 31% of all women married between 1940 and 1947 used appliance methods and 24% used non-appliance methods. For those married between 1935 and 1939 the figures were 37% and 29%. Non-appliance methods were taken to include *coitus interruptus*, abstinence and "safe period". In actual fact the use of abstinence and "safe period" was trivial. There has been a steady growth in the use of appliance methods, and we read that the use of non-appliance methods reached a peak about 1920 to 1929. Practice of birth control was

¹ "Family Limitation and its Influence on Human Fertility during the Past Fifty Years", Papers of the Royal Commission on Population, Volume I, An Investigation Carried out by the Council of the Royal College of Obstetricians and Gynaecologists: 1949. London: His Majesty's Stationery Office. 9½" x 6", pp. 218. Price: 4s. net.

more prevalent among the more educated than among the less educated social groups. In regard to the effectiveness of birth control a great deal is written, but one conclusion may be stated—the effect of the use of birth control was to lower the average number of births per woman by not less than one child; this result was mainly contributed to by a smaller proportion of families of more than five children among those who had at some time adopted control. In regard to the question whether the practice of birth control affects the power to reproduce—one of the chief objects of the whole investigation—it is stated that the pregnancy rates of uncontrolled exposure after control was abandoned were consistently and markedly higher than those of entirely uncontrolled exposure and that this provides clear indication that the use of birth control does not appreciably reduce the power to reproduce. Investigation of involuntary infertility showed that between 7% and 8% of all women are involuntarily infertile. The percentage of children that were stated to be unwanted increased from six in marriages before 1910 to fourteen in marriages during the period 1930-1934. Only 12% of the women with an unwanted child denied that the child came to be welcome in later years. Of the reasons advanced for the use of birth control, the most frequently given by 1822 women were: financial reasons, 38%; the spacing of pregnancies, 25%; health reasons (husband or wife), 17%; housing difficulties, 16%.

Lewis-Fanning states that arrangements have been made by which further studies are assured at some future date on the information contained in the questionnaires.

SULPHONE THERAPY FOR LEPROSY AND TUBERCULOSIS.

In previous references in these columns to sulphone therapy for leprosy (June 12, 1948) and tuberculosis (July 3 and September 18, 1948) we have assumed the generally held view that diamino-diphenyl sulphone, the first sulphone synthesized (according to a report by Fromm and Wittmann in 1908), was too toxic for use in man. This view has now been challenged by John Lowe, director of the Leprosy Research Unit of the Nigerian Leprosy Service.¹ His assertions, if true, are of considerable practical importance and warrant careful examination. A good deal of evidence supports the value of the sulphone drugs in the treatment of leprosy and probably also as an adjuvant to streptomycin in the treatment of tuberculosis. It seems likely (Lowe summarizes the evidence) that the therapeutic action of the more complex and apparently less toxic sulphone drugs depends on their being hydrolysed in the body to diamino-diphenyl sulphone. Unless there is some specific advantage in the more complex drugs, their use is scarcely logical, especially as they are much more expensive. The last point weighs heavily with Lowe, engaged as he is in the treatment of leprosy on a wide scale among the poorer sections of a tropical community. On its present basis, he states, sulphone treatment can never be more than a treatment for the privileged few; the vast majority of those needing the treatment must go without it. On the other hand treatment of a single patient with diamino-diphenyl sulphone could be carried out for about one-twentieth of the cost of the more complex drugs. However, while excessive cost may prohibit use of a drug, no one would suggest that cheapness is a primary factor in permitting its use. The essential question is whether diamino-diphenyl sulphone can be used in treating human leprosy with safety and with good therapeutic effect, and this Lowe has set out to answer.

From a consideration of the blood concentrations of more complex sulphones deemed necessary for therapeutic activity in leprosy, Lowe concluded that the minimum therapeutic blood level of diamino-diphenyl sulphone was perhaps one milligramme per 100 millilitres, or even less. He then demonstrated in a careful preliminary trial with

nine patients with leprosy that it was possible to produce blood levels of this order without toxic effects. The secret appears to lie in the administration of the drug by mouth in small and slowly increasing doses; "the importance of slow induction of the treatment cannot be overstated". The obtaining of a therapeutic blood level with low dosage of the drug is apparently explained by its almost complete absorption from the gut and its slow elimination by the kidneys. These facts also probably explain the toxic effects reported by previous investigators from larger doses. Lowe followed his preliminary trial with more extensive therapeutic trials and has treated 88 patients with leprosy for periods up to a year. Of 50 patients with lepromatous leprosy treated for more than six months, none showed signs of deterioration, 72% were clinically improved, 62% were bacteriologically improved, and three became "bacteriologically negative". Among 15 patients with tuberculoid leprosy treated for from four to ten months, response was apparent within a month, and sometimes within a fortnight or less, with complete subsidence of activity of the skin lesions within six months. The results for each group have been comparable with those obtained with the more complex sulphones, though the impression so far is that diamino-diphenyl sulphone produces results more quickly. Lowe is well aware of the fallacies of assessing methods of treatment of leprosy after short periods, but he does feel that diamino-diphenyl sulphone has produced results comparing favourably with those obtained with the more complex sulphones and that its use has made sulphone therapy (in which he has great confidence) possible for a vast number of patients in tropical countries who would be otherwise excluded. Whether or not it will reduce the duration of treatment remains to be seen. The least that can be said is that Lowe has made a good case for general reconsideration of the use of a cheap drug for the treatment of leprosy, and it is to be hoped that others can reproduce his results over significant periods. In addition, he has thrown out the suggestion that reconsideration of the sulphone treatment of human tuberculosis may be advisable in the light of his findings. No doubt this will be taken up in appropriate quarters.

THE INDEX-CATALOGUE OF THE ARMY MEDICAL LIBRARY AT WASHINGTON.

In February, 1949, appreciative reference was made in the editorial columns of this journal to the Index-Catalogue of the Army Medical Library at Washington. The volume containing references to the first half of the letter M had just been published. This volume is the latest in the fourth set of the Index. It was pointed out that the printed Index-Catalogue so far comprises 57 volumes, that it lists 3,357,755 references, 2,865,201 of which are indexed under subjects. The news has just been received that publication of the Index-Catalogue is about to be discontinued for ever. This decision is the result of a recommendation of the Committee of Consultants for the Study of the Indexes to Medical Literature made at their meeting on December 16, 1949. To call this a calamity is to understate the case. This work has been described as the greatest gift which the American people and American medicine have made to mankind. All who serve in medical libraries and those whose study makes them delve into medical literature will be lost when this index no longer appears. The work has appeared without intermission since the year 1880. Volumes appear at intervals of varying length and it may be some little time before students of medicine, especially post-graduate students, realize what has happened; but the loss will be none the less severe on that account. The decision is, we understand, not yet irrevocable. Others nearer to Washington have expressed their dismay at the news. Perhaps the Surgeon-General may even yet, because of many appeals that are certain to reach him, cause the dire decision to be reversed. If he does he will receive the gratitude of every worker in medical research and of every serious student of the medical sciences.

¹ The Lancet, January 28, 1950.

Abstracts from Medical Literature.

PHYSIOLOGY.

Factors in Explosive Decompression Injury.

E. L. COREY (*The American Journal of Physiology*, April, 1949) states that in experiments designed to eliminate the presence of anoxic anoxia, rats were explosively decompressed to normal atmospheric pressure after exposure to positive pressures of from two to thirty atmospheres for varying time intervals. Decompression from two to as much as six atmospheres (equivalent gas expansion differential 18,000 to 42,000 feet) was well tolerated, and such decompressions may be considered to be entirely innocuous for the rat. Of rats decompressed after thirty-minute exposures to seven to eleven atmospheres of pressure, 77% died. Aeroembolism was present in 82% of these animals, with pulmonary lesions in 18% of the cases. All animals succumbed after decompression from eleven atmospheres of pressure (gas expansion equivalent 55,000 feet) when so maintained for thirty minutes prior to release of pressure. Without exception these animals exhibited gas emboli, while pulmonary hemorrhage was present in only 15% of cases. All rats which died after explosive decompression from twenty atmospheres of pressure gave evidence of severe aeroembolism, while pulmonary lesions could be demonstrated in only 43% of such animals. Decompression after a fifty-second exposure to thirty atmospheres of pressure was invariably fatal. On the other hand, all survived this pressure change when time under pressure was reduced to ten seconds. Pulmonary hemorrhage occurred in 50% of rats dying from anoxic anoxia (nitrogen at normal atmospheric pressure). The authors consider that the results of these experiments indicate that anoxic anoxia and aeroembolism constitute the major factors in the etiology of explosion-decompression injury, and that intrapulmonary gas expansion may be considered of relatively minor importance as a lethal agent.

Analgesia and Anæsthesia Induced by Adrenaline.

A. LEIMDORFER AND W. R. T. METZNERREPORT (*The American Journal of Physiology*, April, 1949) state that intracisternal injection of adrenaline alone (one-half to one milligramme per kilogram) produces surgical anæsthesia in dogs. An additional amount of adrenaline (one-half milligramme per kilogram) is necessary to accomplish complete surgical anæsthesia for laparotomy. When small amounts of "Nembutal" are injected intraperitoneally several hours prior to intracisternal injection of adrenaline, a smaller amount of adrenaline (one-half milligramme per kilogram) is adequate for complete surgical anæsthesia. The blood pressure, electrocardiogram and electroencephalogram remain normal after intracisternal injection of adrenaline in the mentioned doses. The respiration is not depressed, but rather stimulated (mainly in amplitude). No after-effects are observed. Excessively great doses of epinephrine given intra-

cisternally (about two and a half to three milligrammes per kilogram) are toxic. The possibility of extending these investigations for use in operation on man is discussed. The intracisternal injection of ephedrine sulphate or procaine hydrochloride does not produce analgesia or sleep in the dog.

Variation in Acetyl-Choline Content of Brain with Physiological State.

D. RICHTER AND J. CROSSLAND (*The American Journal of Physiology*, November, 1949) report that the acetylcholine content of rat brain, determined by rapid fixation by freezing with liquid air, varies with the physiological state of the animal. The level was significantly raised in animals taken during anæsthesia and during sleep; it was significantly lowered in animals taken during emotional excitement, after electrical stimulation of the brain and during convulsions. The acetylcholine level thus appeared to vary inversely with the degree of functional activity of the brain. The observed changes were relatively large. Electrical stimulation for one to three seconds caused a loss of over 50% of the whole brain acetylcholine content. The level was raised in anæsthesia 40% above the normal value and more than 300% above that of animals taken during convulsions. Studies of the rate of loss and resynthesis of acetylcholine *in vivo* showed that the changes were rapidly reversible. The rate of resynthesis after electrical stimulation was such that under these conditions the brain could synthesize approximately seven microgrammes of acetylcholine per gramme, or more than five times the normal brain content, in one minute. The changes were shown by the use of specially rapid methods, and the results do not therefore disagree with those of other investigators who have used less rapid techniques.

Relative Velocities of Plasma and Red Cells in the Circulation.

E. D. FREIS, J. R. STANTON AND C. P. EMERSON (*The American Journal of Physiology*, April, 1949) describe a method for determining the relative velocity of identified plasma and cells during a single circulation through an isolated peripheral segment of the circulation (the forearm) in man. In six experiments the mean velocity of the cell mass was found to be perceptibly greater than the mean velocity of the plasma mass, thus demonstrating in the circulation of man the principles governing the velocity of particles in a stream subjected to laminar flow. The observation that the mean velocity of the cell mass is greater than the mean velocity of the plasma mass is consistent with the laws of Poiseuille concerning the movement of fluid in tubes, and of Fahraeus concerning the movement of cells in the blood. The velocity of flow in the blood vessels is laminar in character because of the frictional resistance of the vessel walls and intramolecular friction, being greatest in the centre of the stream and least at the periphery. This streaming effect is amplified by two factors: the viscosity of the blood and the relatively small diameter of the individual capillaries. Laminar flow would be most pronounced in the capillaries, where a given volume of plasma is exposed to a greater frictional surface area than in the large vessels. The velocity gradient between this slow-moving plasma at the capillary walls and the

fast-moving plasma in the centre of the stream, therefore, would be large. Further, since by Bernoulli's law the lateral pressure of the fluid in a tube is inversely proportional to the velocity of flow, the larger the difference in velocity between the centre and the periphery of the stream, the greater will be the gradient of lateral pressure. Hence, in the minute vessels such as the capillaries, where the velocity gradient is very large, the pressure gradient from the axis to the periphery of the stream also will be large. Thus, in the capillaries the velocity will be greatest in the centre of the stream, but the pressure will be lowest in this region. As a consequence, the cells, which are in effect particles floating in a liquid menstruum, will be forced into the area of least pressure, the central stream, which is also the region of greatest velocity. Thus, the greater mean velocity of the cell mass may be explained readily in terms of established laws of hydraulics. These data, therefore, support the conclusions of Stead and Ebert and of Gibson and his co-workers that the hæmatocrit value of the capillary blood is significantly lower than the hæmatocrit value of blood flowing in larger vessels. The falsely high hæmatocrit value in the large vessels may explain at least in part the fact that the total blood volume, calculated from the plasma volume and such a hæmatocrit value, usually is significantly higher than the total blood volume calculated from the red cell volume and plasmatocrit value.

BIOCHEMISTRY.

Brain Metabolism.

R. V. COXON AND C. LIÉBECQ (*The Biochemical Journal*, Volume XLV, Number 3) have found an accumulation of citrate and α -ketoglutarate to accompany the oxidation of pyruvate by dialysed "dispersions" (that is, finely ground homogenates) of pigeon brain in a medium containing fumarate and reinforced with magnesium ion and adenine nucleotide. This evidence, despite the previous observation in their laboratory that citrate cannot replace fumarate in its effect on the oxygen uptake of these preparations, is taken to favour the operation in them of a tricarboxylic acid cycle when fumarate is present. When fumarate is absent, the oxidation of pyruvate is associated with the formation of acetate.

Lipids in Wallerian Degeneration.

A. C. JOHNSON, A. R. McNABB AND R. J. ROSSITER (*The Biochemical Journal*, Volume XLV, Number 4) determined the concentration of cerebroside, total and free cholesterol, total phospholipin, monoaminophospholipin, lecithin, total fatty acid and neutral fat in degenerating cat sciatic nerves at intervals of time from four to ninety-six days after nerve section. From these figures the concentration of ester cholesterol, sphingomyelin, cephalin, essential lipid, myelin lipid and total lipid was calculated. The wet weight of the degenerating nerve increased rapidly, reaching a maximum in four days and returning to normal after sixty-four days. The total lipid content of the nerve decreased steadily throughout the course of degeneration. The amount of neutral fat decreased rapidly, reaching a minimum in between

four and eight days, and returned to normal after thirty-two days. The amount of myelin lipids (cerebroside, free cholesterol and sphingomyelin) changed little during the first eight days and then decreased rapidly, and to the same extent, in between eight and thirty-two days. The cholesterol content changed little during the first eight days. Between the eighth and thirty-second days free cholesterol decreased rapidly in amount and ester cholesterol, absent in control nerves, increased, reaching a maximum by the end of sixteen days. The total phospholipin content, which changed little during the first eight days, decreased rapidly in between eight and thirty-two days. Sphingomyelin decreased in amount at a similar rate, whereas cephalin decreased more rapidly and lecithin more slowly. The results are discussed with reference to the chemical nature of the lipids of "myelin" and to the changes that occur in the lipids when a nerve undergoes Wallerian degeneration.

Enzyme Activities in Blood.

P. E. H. JONES AND R. A. McCANCE (*The Biochemical Journal*, Volume XLV, Number 4) found the mean cholinesterase activity of the sera obtained from cord blood to be 50.2 units for the "pseudo" enzyme and 0.827 unit for the "true" enzyme. The mean value for normal adult serum was 76.7 units and 1.053 units respectively. The differences were statistically significant. The activities of the erythrocyte enzymes, true cholinesterase, glyoxalase, carbonic anhydrase, and catalase obtained from cord blood were found to be 32.8, 281, 9.1×10^5 and 19.23 units per milligramme of iron. The corresponding values for normal adults were 43.8, 555, 36.6×10^5 , and 27.7 units per milligramme of iron. All differences were statistically significant. The erythrocyte acid phosphatase activity was measured in cord blood and was found to be 4.84 units per milligramme of iron; the adult control group had a value of 4.6 units. The difference was not statistically significant.

Ammonia in Protein Synthesis.

D. B. SPRINSON AND D. RITTENBERG (*The Journal of Biological Chemistry*, September, 1949) measured the rate of utilization of dietary ammonia nitrogen for protein synthesis by determining the rate of excretion of labelled nitrogen. With a diet of high protein content ammonia nitrogen is nearly quantitatively excreted; almost none is utilized. With diets of very low protein content an appreciable fraction of the ammonia nitrogen is employed for protein synthesis. The relationship between the isotope concentrations of the urinary ammonia and urea following administration of labelled ammonia or amino acids is discussed. A modified procedure for the preparation of gas samples for mass spectrometric analysis is described.

Amino Acids and Tissue Protein.

D. B. SPRINSON AND D. RITTENBERG (*The Journal of Biological Chemistry*, September, 1949) have measured the rate of interaction of N^{15} -labelled glycine with the body proteins in rats and human subjects. They state that from these data it is possible to calculate the rate of protein synthesis and the size of the nitrogen pool. The rates of protein synthesis per kilogram of

body weight are 1.0 and 0.20 gramme of nitrogen per day for the rat and human respectively. From the approximately known turnover times of the different organs and the synthetic rates for the whole organism, it appears that only a fraction of the muscle protein is extensively involved in dynamic state.

Carbonic Anhydrase.

M. D. ALTSCHULE AND H. D. LEWIS (*The Journal of Biological Chemistry*, September, 1949) have devised a method in which a value related to unimolecular velocity constants is employed for measuring carbonic anhydrase activity of blood at body temperature with standard Warburg apparatus. It has the advantages of eliminating some errors inherent in earlier methods, such as those consequent to low temperatures, lack of linear relation between enzyme concentration and activity, and mathematical invalidity of calculations used. On the other hand, it affords no true indication of activity of the enzyme *in vitro* because of the differences in pH and in ionic constitution of the media used as against the interior of erythrocytes in blood.

Hexokinase Activity of Erythrocytes.

W. R. CHRISTENSEN *et alii* (*The Journal of Biological Chemistry*, September, 1949) have studied the hexokinase activity of rat red blood cells by a manometric technique. They state that chemical analyses for glucose and phosphorus compounds have shown that the following equation is satisfied during the reaction: $\text{NaHCO}_3 + \text{glucose} + \text{ATP} \rightarrow \text{glucose-6-phosphate} + \text{ADP} + \text{CO}_2$. Mannose and fructose, but not galactose, can replace glucose in the reaction. The relative rates of phosphorylation of glucose, mannose and fructose are in the ratio of 1.0:0.77:0.36. The reaction is inhibited by plasma, and it is necessary to wash red blood cells three times before hemolysis in order to obtain maximum hexokinase activity. The plasma factor does not appear to be pituitary in origin. Increasing the salt content of the reaction mixture also retards the reaction. The activity of the enzyme as obtained from normal rats is not affected by the addition of insulin or adrenal cortical extract. Enzyme preparations from diabetic or hypophysectomized animals show no essential variation in activity from those of normal animals and are also uninfluenced by hormone additions.

Methionine in Cystinuria.

L. J. REED *et alii* (*The Journal of Biological Chemistry*, September, 1949) fed radioactive methionine, containing approximately 100 microcuries of S^{35} , to a human cystinuric patient without harmful effects. Cystine was isolated from the urine and from newly grown hair and was found to be radioactive. Most of the radioactive sulphur (81.6%) was retained by the subject during a period of four days, only 18.4% being excreted; 2.6% of the administered radio-sulphur was excreted in the form of cystine during the first four days after the administration of the methionine. During the first day after feeding of the radioactive methionine, 13.3% of the radioactive sulphur was excreted. There was a slow loss of isotope into the urine for a period of seventy days, at the end of which time the experiment was terminated. The radioactivity of the neutral sulphur fraction of the urine was greater than

that of the cystine sulphur. Preliminary experiments with paper chromatograms have indicated that this additional activity was not due to excreted methionine. The results are compared with those obtained with cystinuric dogs.

Metabolic Functions of Biotin.

P. R. MACLEOD *et alii* (*The Journal of Biological Chemistry*, October, 1949) have found that the synthesis of citrulline from ornithine by washed residue of biotin-deficient rat liver homogenates is decreased about 50% below that of pair-fed controls. The low rate of synthesis by the deficient liver may be increased by the addition, *in vitro*, of a heated residue of normal rat liver homogenate. It is increased to normal within twenty-four hours by treating the deficient animal with biotin given as two intraperitoneal injections. Dietary deficiencies of riboflavin or vitamin B_6 did not affect the rate of citrulline synthesis by washed liver residue.

MEDICINE.

Focal Infection in Rheumatoid Arthritis.

L. S. P. DAVIDSON, J. J. R. DUTHIE AND MAX SUGAR (*Annals of the Rheumatic Diseases*, September, 1949) discuss focal infection in rheumatoid arthritis, and compare the incidence of foci of infection in the upper part of the respiratory tract in 100 cases of rheumatoid arthritis and 100 controls. This study revealed that actual or potential foci were found in 44% of cases of rheumatoid arthritis, and in 43% of controls. Only eight patients in the rheumatoid group gave a history of an infection of the upper respiratory tract within three months of the onset of the arthritis. No significant information was obtained from differential counts of the cells in material expressed from a tonsillar crypt or from bacteriological examination of the tonsils and pharynx, which was of value in differentiating the cases of rheumatoid arthritis from the controls. The results obtained do not suggest that infections of the ear, nose or throat play an important part in the aetiology of rheumatoid arthritis.

Atherosclerosis.

D. ADLERSBERG, A. D. PARETS AND E. P. BOAS (*The Journal of the American Medical Association*, September 24, 1949) discuss the genetics of atherosclerosis. They state that xanthomatosis including *xanthoma tuberosum* and *tendinosum* are not rare disorders. They have recently studied 201 persons, 49 of whom exhibited hypercholesterolemia, coronary artery disease, and either *xanthoma tuberosum* or *tendinosum*, xanthelasma or corneal arcus. The serum cholesterol content in 69% of these patients was above 300 milligrammes per centum (a value of 280 to 300 milligrammes per centum was regarded as normal). Coronary artery disease was present in 40% of the 201 persons. It is suggested that an hereditary disturbance of cholesterol metabolism associated with a raised serum cholesterol level is the common factor in coronary atherosclerosis. The serum cholesterol content of all youngish patients with coronary atherosclerosis should be determined.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on September 7, 1949, in the Medical Society Hall, East Melbourne. Dr. ROBERT SOUTHEY, the Vice-President, in the chair.

Prematurity.

Dr. KATE CAMPBELL read a paper entitled "The Clinical Management of the Premature Infant" (see page 253).

Dr. BARBARA MEREDITH read a paper entitled "Statistical and Public Health Aspects of Prematurity" (see page 258).

Dr. DONALD LAWSON read a paper entitled "Premature Labour" (see page 262).

Dr. W. REFSHAUGE emphasized the need for warmth and oxygen as well as for minimal handling of premature babies, and discussed the difficulty of transporting them from where they were born to the institution in which they were to receive the skilled attention that produced the best results. He went on to describe a "premature ambulance" which had been constructed recently at the Women's Hospital to cope with the problem of transport.¹ Dr. Refshaug explained that it was constructed for portability with provision of the requisite warmth and a continuous supply of oxygen for the journey. The cot could be lifted readily into a motor-car or ambulance and was available through the Civil Ambulance Service for the transport of premature or sick, frail babies from the place of birth to the institution selected because of the availability of special facilities. He said that there was excellent cooperation between the Civil Ambulance Service and the staff at the Women's Hospital to expedite the supplying of the "premature ambulance" at very short notice.

Dr. ROY F. WATSON thanked the speakers for their several contributions, which presented the problems of prematurity from various angles. He was gratified to note the close cooperation between the parties interested in the subject, and as deputy chairman of the Hospitals and Charities Commission, he thanked all who had rendered such valuable assistance to the commission in devising a plan to organize the proper care of premature babies on an efficient basis. He referred particularly to the clinicians, hospital representatives and delegates from the Maternal Hygiene and Infant Welfare Section of the Health Department, the baby health centres and the infant welfare training schools, who had spent much time at meetings as a special committee invited to advise the commission in the formulation and implementation of the project. He added that the commission had recently distributed a descriptive leaflet to members of the profession throughout the State, informing them of the organization in detail with the provision of a list of hospitals and institutions known to have satisfactory facilities for premature babies. Dr. Campbell and Dr. Refshaug, acting as a subcommittee, had worked out the practical details and had rendered enormous assistance and highly appreciated service to the committee and to the commission. It was confidently anticipated that, as a direct result, many more of the feeble and premature babies would survive, and in due course would become good citizens.

Dr. JOHN COLEBATCH said that the subject matter of the three papers was of immense practical value in the prevention of prematurity and of its complications; so much was that the case that it should be made known to all general practitioners, of whom he could see very few present at the meeting. With reference to the valuable service to be provided by means of the "premature ambulances", he suggested that it might not be wise to concentrate the facilities for the management of premature babies in a relatively few large central hospitals. Some of the small hospitals in the outer suburban area might be assisted to provide the necessary special accommodation and staff for the treatment of premature babies; that provision might produce results favourably comparable with the excellent results that were being obtained in the mothercraft homes and training centres. In conclusion, Dr. Colebatch asked Dr. Lawson what was the proportion of premature births, hitherto unexplained, that might be attributed to the endocrinopathies.

Dr. Lawson, in reply, said that a number of premature births were due to endocrinal causes.

¹ One of the special cots known as the "premature ambulance" was displayed and was available for inspection at the meeting.

Dr. JOHN F. WILLIAMS commented on the number of children who came under his notice because of psychiatric problems and who had serious difficulties at birth; the mother had experienced long, hard labour, or the infant had been difficult to resuscitate or had not been fit to meet the mother for several days after birth. The facts pointed to the possibility of anoxemia. He asked Dr. Campbell whether she considered that such a condition in a young baby could bring about organic changes in the cerebral tissues which might help to produce the psychological phenomena he encountered in practice.

Dr. Campbell, in reply, said that premature children were capable of becoming normal; but while they were young and frail they were apt to receive too much notice, and that might lead to problems of behaviour later in childhood.

Dr. W. OSTERMEYER referred to the importance of a certain degree of humidity for the well-being of premature babies.

Dr. Southby, from the chair, thanked the opening speakers for their excellent presentations of the important subject. He, too, regretted the absence of general practitioners, who were usually the first to make contact with premature babies. Dr. Southby then referred to sclerema in the newborn, and expressed the opinion that it was preventable if those in charge of frail babies were constantly on the alert for early manifestations such as subnormality of body temperature, especially when the weather suddenly became cold.

A MEETING of the New South Wales Branch of the British Medical Association was held at Broughton Hall Psychiatric Clinic, Leichhardt, New South Wales, on November 17, 1949. The meeting took the form of a series of clinical demonstrations arranged by the medical superintendent, Dr. GUY LAWRENCE. Parts of this report appeared in the issues of January 7 and 28, and February 4, 1950.

Psychosomatic Medicine.

Dr. LAWRENCE briefly discussed psychosomatic medicine and pointed out that the following had been listed as having a psychosomatic element: paroxysmal rhinorrhoea and bronchial asthma, gastric and duodenal ulcers and ulcerative colitis, essential hypertension and arterial degeneration including coronary artery disease, hyperthyroidism, migraine, chronic arthritis, urticaria and pruritus, enuresis and primary dysmenorrhoea. Those illnesses had a common quality in that the major disturbances of function corresponded to known bodily manifestations of emotion.

Arterial Hypertension and Personality Factors.

Dr. Lawrence said that in the course of routine physical examination of patients admitted to Broughton Hall, it had been found that female patients whose ages came within the involutional epoch had raised blood pressures. On charting blood pressure against age in male and female patients respectively, one saw in respect to female patients a steep ascent in the curve commencing in the fifth decade, whereas in males such an ascent was not observed for another ten or fifteen years. It would seem, therefore, that during the female involutional period there was some factor operating which conduced to hyperplasia. Several patients would be shown to illustrate the frequency of hyperplasia among the female patients of the clinic. They represented about 12% of the female patients under treatment, whereas 3% of the male patients were hyperplastic. From the psychiatric point of view, there was no specific syndrome associated with hyperplasia; in many cases the condition was discovered only in the course of routine examination and was not related causally to the patient's symptoms. Perhaps the most frequently seen and most directly produced psychiatric manifestations of hyperplasia were anxiety states. They represented the patient's emotional reactions to such physical disturbances as precordial pain, palpitation or dizziness. It had been said that patients suffered more from the knowledge that they had high blood pressure than from the condition itself. These hypertensive anxiety states responded well to rest, mild sedation and psychotherapy. If the depressive factor was severe, then subconvulsive electroconvulsive therapy was often of use. Gregory Gressel and others, as the result of work done, had found (1948) that personality malfunctioning was unusually frequent in hypertensive subjects. The general pattern of maladjustment in interpersonal relations in such persons had been considered to be unexpressed or displaced hostility, continued emotional lability, with frequent depression or anxiety, or both, chronic anxiety, perfectionism, compulsiveness, difficulty with authority.

Dr. Lawrance then presented a single female, aged forty-seven years, a shop assistant, who had been admitted to the clinic on May 15, 1946. She had not been well for about a year, and had had treatment from quite a number of doctors, without any improvement in her feelings. On admission to Broughton Hall she was moaning and restless. She said she had feelings in her stomach of churning, and it distressed her. She had turns in which she felt "awful—no other word for it". She had some failure of vision, could not bear anyone to touch her, could not concentrate well, and was unduly self-absorbed. She was timid, and threw her body about restlessly. Incipient cataracts were present, her blood pressure was 180 millimetres of mercury (systolic), 95 millimetres (diastolic), her pulse rate was 80 per minute, and the radial arteries were very firm. There was a history of a broken love affair with a man who had had regular intercourse with her for years. He had married another woman. The patient felt soiled and impure, and longed for purification. She had formed a very strong attachment for a girl. She had very powerful quiet feelings. A course of electroconvulsive therapy was given and the patient made a fair recovery. In 1947 she returned to the clinic in a condition of depression and retardation with suicidal feelings and restlessness. She could not concentrate, and was hard to manage. Her blood pressure was 190 millimetres of mercury (systolic) and 118 millimetres (diastolic), her pulse rate was 82 per minute, and there was a hardening of the arteries. She had not yet completed the menopause. She had glycosuria, which was controlled by diet. Again a course of electroconvulsive therapy put her "on the road". In 1948 she returned depressed and self-absorbed. She was afraid of everything, even of being at the clinic, had insomnia, failure of the legs to bear her weight, and "blackouts". Her condition more resembled a state of anxiety hysteria. Her blood pressure was 205 millimetres of mercury (systolic) and 120 millimetres (diastolic), and her pulse rate was 84 per minute. Again electroconvulsive therapy restored her, and she went out to work. In 1949 she returned because she could not concentrate, was forgetful and felt that all was not well with her. Subconvulsive electroconvulsive therapy helped her, and she became much brighter again. Her blood pressure at the time of the meeting was 220 millimetres of mercury (systolic) and 121 millimetres (diastolic), and her pulse rate was 100 per minute. The urine was normal. The radial vessels were hardened. The patient exhibited attacks of depression with anxiety features and continued lability of her emotional system. She had some narcissistic traits and was most particular as to her personal appearance.

The next patient, a married woman, aged sixty-seven years, having no children, whose husband was alive and in comfortable circumstances, had been admitted to the clinic on September 29, 1949. Five of her six siblings had predeceased her. Her father had died when she was aged four years; he and all members of his family had died of heart disease in their forties. Her married life had been happy, and she had had very little illness. However, for two years she had been finding her daily work irksome and tiring, and had become somewhat depressed and occasionally lachrymose. A year before the meeting she had developed sepsis in a bunion, and had then come under the notice of physicians. She was very worried over her foot, her appearance and the difficulty of getting shoes. She was found to have a blood pressure of 210 millimetres of mercury (systolic) and 90 millimetres (diastolic), and a pulse rate of 86 per minute. Some arteriosclerosis was present. She had some retardation and slight giddiness at times, and in view of her family history of heart disease she worried unduly over her condition of hyperplasia. She decided that it was not safe for her to go out of her house, because she might have a stroke in the street. She was a chatterer of trifles, and lately had uttered endearments to strangers. She had improved considerably with her stay in hospital, and reference to the cardiologist with the finding of a favourable electrocardiogram had helped her considerably.

Dr. Lawrance remarked that she had always been rather dominant and possessive in regard to her husband, who had received the care and advice usually given to children (she had none), and in her own person she had been a perfectionist. The presence of the septic bunion and the hyperplasia had given those traits a severe setback, and depression had been the result.

Duodenal Ulcer with Depression.

Dr. Lawrance then presented a male patient, aged forty-one years, married, with no children, a clerk, who had been admitted to the clinic about a month previously. He had come with a history of acute depression associated with ideas of persecution and, at times, auditory hallucinations.

His heredity was normal. He had been a weak child and remained physically inferior. He had a good industrial history, was socially restricted, was married to a woman of excellent physique, and was socially and economically more successful than he had ever been. He had always been conscious of his general physical inferiority (height, five feet six inches; weight, about eight stone) and of the fact that the marriage, for unknown reasons, remained childless. Since 1938 he had been suffering from duodenal ulcers. His gall-bladder and appendix had been removed in 1938; a gastroenterostomy had been performed in 1947. For the past eleven years his life had been dominated by his ulcers, forcing him to lead a careful life and adhere to a strict diet. During his present breakdown he had become morbidly depressed and hallucinated. He could hear a neighbour making the remark, "What a man", questioning his virility. He referred that to his inadequate physical condition and inability to produce progeny. He was given a short course of electroconvulsive therapy, with the result that his mental and physical health had greatly improved. He gained eight pounds in weight, and his "stomach" had not been causing him much discomfort lately. The interesting feature of his condition was that a feeling of constitutional physical inadequacy, aggravated by an environmental factor (his wife in contrast was tall and had an excellent physique), had led to an acute psychotic episode, with aggravation of his physical illness. On the other hand, his emotional difficulties seemed to play an important part in the aetiology of his ulcers, and had established a vicious circle.

Depressive State with Migraine.

The next patient, a married woman, aged fifty-one years, with one child, had been admitted to the clinic on September 26, 1949. She was the fourth child in a family of five, and had not been a strong girl. She had had meningitis, cystitis and measles in her youth, and nine years before the time of the meeting had undergone total hysterectomy for the relief of headaches. Perineal repairs had been carried out on two occasions, and her appendix had been removed. She had a son aged twenty years, and had lost a baby at the age of one year—from scalding. The patient was happily married, and her husband was a very reasonable man. She restrained his acts of coitus and, to avoid upsetting her nerves, he did not complain. The present illness had been productive of severe attacks of migraine for eighteen years. Any exertion or excitement set up the headaches, with flashes of light and spots of red and pink colour before the eyes, nausea and trembling. If the patient vomited, the head pains were relieved temporarily; she did best if left alone in the dark. The headaches had once been hemispherical, but since the hysterectomy they had been more frontal, with, however, a tendency for the left side to be worse (there was no sinus trouble). The attacks came on once a month, or oftener, and they lasted two or three days. The patient was a short, lightly built woman, with a blood pressure of 180 millimetres of mercury (systolic) and 90 millimetres (diastolic), and a pulse rate of 90 per minute. Her arteries were healthy. There was often a slight tremor of her outstretched hands. There was definite relationship between the onset of the attacks and little upsets in the house, worries about the son, the husband *et cetera*. If there was some definite task she had to do, such as a special trip to town, or some particular meeting with friends arranged, then the attacks of pain came on. It seemed that the patient had had a traumatic episode in her childhood, when she was repeatedly raped at the age of six years by a relative who was caught *in flagrante delicto*. After that she had a lot of bladder trouble, and she evidently had been physically injured. A later shock was when her baby was scalded to death—about twenty years before. After that, *coitus interruptus* was indulged in until the hysterectomy nine years before the meeting.

Dr. Lawrance pointed out that the patient's head pains were accompanied by feelings of depression, and rendered her unable to carry on her normal life. She was an intelligent, well-spoken woman, well informed despite her broken schooling and her poor home life as a child. The father had been a very heavy drinker, and many quarrels had occurred between her parents. There was enough evidence in her case history to indicate that her emotional life had been a stormy one. That, added to the fact that her father was a heavy alcoholic, made it plain that unconscious conflict played an important part in the aetiology of her illness. Jolliffe and White had suggested psychoanalysis for severe recurrent migraine in neurotic individuals. They said that migraine was one of the most universal scapegoats for ameliorating psychological conflicts. The possibility of cure after so many years was very doubtful, but the complaint was one which commenced oftenest in childhood or

adolescence, and fortunately diminished as middle age or old age approached.

Anxiety State with Cardiac Neurosis.

Dr. Lawrence then presented a married man, aged sixty years, a retired clerk, who had been admitted to the clinic on August 16, 1949. He had been referred for treatment on account of paroxysmal tachycardia deemed to be of functional origin. He had two children, aged thirty-two and twenty-four years respectively, both well and both suitably married. He was contented in his marriage, and was on superannuation pay. He had had many sicknesses as a child, including vomiting and palpitation of the heart as a schoolboy. In 1941 he had had tachycardia, accompanied at times by syncopal attacks. He was a total abstainer and a non-smoker. He had done no work for two and a half years. For over two years he had been mildly depressed and emotional; he tended to be introspective, but gave a clear story of his troubles. He had attacks of tachycardia, big and little, associated with a feeling of impending death; he sank to his knees, and had fallen over. There was no loss of consciousness. The big attacks lasted for twenty-four hours, and stopped after morphine injections; the little attacks lasted twenty to thirty minutes. The former were experienced five or six times a year, and the latter almost every day. He complained of catarrh in the head, nose and throat, was mostly tired, and was unable to do any work, because even a slight exertion might precipitate an attack of his trouble. He slept poorly, but responded well to mild sedation; anxiety predominated. He was able to have intercourse once a month, but it was an ordeal for both partners, as a hysterectomy had left his partner with an unnaturally small passage, and that worried the patient considerably. He showed no gross overt distress, and looked younger than his years. The result of his troubles was that he could not concentrate, could not follow any interests, and was over-concerned with his cardiac apparatus. He had had an attack under observation while in the clinic—the pulse rate rose to 138 per minute and continued at that for several hours. His blood pressure was 170 millimetres of mercury (systolic) and 116 millimetres (diastolic), and his normal pulse rate was 90 per minute. His vessels were palpable but not thickened, and the heart's action was orderly. An electrocardiogram showed that there was no basic heart disease.

Dr. Lawrence, in his comment, stated that anxiety was a state of disquietude, uneasiness and foreboding of mind concerning some anticipated event. McDougall said that it was the name by which we denoted our state of mind when the means we were taking towards the desired end seemed to be inadequate; when we cast about for alternatives, and began to anticipate the pain of failure. Difficulties and failures in work, sexual maladjustments and mental conflicts were all common causes. The patient under discussion had had cardiac palpitation as a child, due to some unknown factor, and having been a delicate boy, he was probably pampered at those times. He blamed overwork as a clerk for the illness, but the work had become too hard after his wife had had a hysterectomy performed and his sex life was really ruined. He had led a very correct life, and suffered frustration honestly. The anxiety so caused rather naturally became of the displaced variety and was projected upon the heart, an organ that on previous occasions had been in some prominence. Tachycardia, cardiac discomfort, with a feeling of constriction and a fear of impending death, were common symptoms of a cardiac neurosis, and they were shown by the patient. Lack of proper attention, poor concentration and a feeling of fatigue supported that, and the result was a man in fair average health unable to work at all. Treatment would be directed firstly to allaying his uneasiness by rest and mild sedation, with some psycho-analytical measures. Dynamic methods could be tried only later. Subcutaneous insulin therapy was much used to allay anxieties of the type concerned. Prognosis for cure was not very good, because the symptoms had been present for a long time.

Neuropathy with Bronchial Asthma.

The next patient was a man, aged twenty-two years, single and a crane driver. His mother, who was known to be emotionally unstable, had been receiving treatment from a psychiatrist periodically. His father had married twice; the patient was the youngest of three children. No asthma had occurred in the family. The patient had been a healthy child until the age of seven years, when he developed the first attack of asthma. He had since been subject to frequent and distressing attacks, grossly interfering with his schooling, as he was able to attend school only half the time. His first nervous breakdown had occurred at the age of seventeen years, after a severe attack of asthma; he had

spent three months in bed, felt hopeless and helpless, and expressed fear of insanity and of "everything". He had improved at that time without treatment in hospital, but had remained somewhat tense and emotionally over-active.

He had been admitted to Broughton Hall on October 19 in a state of acute anxiety. He complained of palpitation and was lacking in concentration powers and inability to control his temper, the latter being particularly directed towards his girl friend (he intended to marry in the near future). He blamed worry over his forthcoming marriage for his breakdown. His asthma attacks had been lately more severe and of longer duration than usual. On admission he displayed signs of a severe asthma attack. The clinical diagnosis was anxiety state with bronchial asthma. The case illustrated a psychosomatic aggravation of symptoms due to emotional stress. Prolonged erotic states associated with illicit gratification of libido and *coitus interruptus* were common causes of psychoneurosis.

Bronchial Asthma in a Hysteroid Personality.

A male patient was then shown, a showman, aged forty years, married, with three children. He had been always healthy, had had the usual education and had passed the "Q.C." examination. He had done all sorts of work since he left school at the age of fourteen years, his home life was happy, but his wife was frigid and he practised *coitus interruptus*. He had been admitted to the clinic, on the first occasion, in 1939, from a local hospital. His symptoms were "intermittent" rigidity in the face, arms and legs. He was mentally clear, and was able to give a rational account of himself. He blamed his work in an atmosphere of zinc oxide dust for his condition. It was considered at that time that the attacks of generalized muscular rigidity, at times alternating with pseudoclonic movements in the arms and legs, were due to hysteria. Under Weir-Mitchell treatment he had improved sufficiently to be discharged into the care of his wife. After some further treatment as an out-patient, he was able to return to work free of symptoms. He was readmitted in 1946 with the history of having developed frequent attacks of asthma after the slightest exertion or after lying down in bed. He had been drawing sustenance from the Department of Social Services for a period of three years prior to his admission. He eventually applied for an invalid pension. That was rejected by the Federal health authorities on the grounds that his asthma was of hysteroid type and should respond to treatment. He was given a course of electroconvulsive therapy, and was able to leave the hospital after six months, well enough to resume work as a showman. Lately he had been to Broughton Hall again, and recently had applied for readmission, suffering from severe asthma attacks. He said that of all the treatment he had received, electroconvulsive therapy gave him the most satisfactory relief. In view of the fact that his asthma attacks responded effectively to electroconvulsive therapy, and of his past history, it could be assumed that his asthma presented a somatic reactive type to an emotional disturbance.

Hyperpiasis with Adrenal Haemorrhage.

The last patient in the psychosomatic group was a married man, aged thirty-nine years, a labourer, who had been admitted to the clinic on April 21, 1949. He was the son of a labourer, and had been a delicate child and a poor scholar. His father had been chronically ill, and could not support his family. The patient had worked in a foundry for twelve years and in the boat trade for five years, and at the time of admission he and his wife worked as "usefuls" in a guest house. He had taken another man's wife as a *de facto* wife until her husband divorced her and took his three children away. He had then married his present wife, who had grown to be sexually dependent on him; she did the work, and he drank heavily and gambled. His gall-bladder and appendix had been removed. The history of his present illness was that for years he had been drinking heavily, but more recently his tolerance had become reduced. He could not stop drinking when he started, and he was shaky and uncertain afterwards. He had become argumentative and irritable lately, and his wife had become afraid lest he harm her or take his own life. He had become depressed and tense, and his wife had threatened to leave him. When sober, his overt conduct was good, and he could give a good account of himself. He, however, displayed inadequate insight into his drinking habits, and exhibited only a superficial desire to reform his ways. The diagnosis made was alcoholism in a neuropathic personality. Physical examination revealed a blood pressure of 205 millimetres of mercury (systolic) and 150 millimetres (diastolic), and a pulse rate of 80 per minute, with some thickening of the radial arteries. He had a course of "Somnifaine" therapy lasting a month, and he felt much better in all ways, and did some light

gardening as occupational therapy, going home on July 27, 1949, with a blood pressure of 205 millimetres of mercury (systolic) and 145 millimetres (diastolic). He was readmitted on September 12, 1949, confused, disorganized and disorientated in all spheres. He was restless and wandering and very labile in his emotions, and gave no story of himself. He was now suffering from a confusional state, with peripheral vascular failure. His blood pressure was 132 millimetres of mercury (systolic) and 108 millimetres (diastolic), and his pulse rate was 102 per minute. He was very delirious, and heard people shouting at him. He was calmed by sedatives and intravenous injections of 50% glucose solution containing small doses of insulin. On September 18 his blood pressure was 122 millimetres of mercury (systolic) and 98 millimetres (diastolic); he was still very confused and said that he expected to die. He was examined by Dr. Hogan, who advised the administration of five millilitres of "Corten" by the intravenous route twice a day for one day and then once daily, and one millilitre of adrenaline in oil by the intramuscular route four-hourly. His blood pressure had fallen to 110 millimetres of mercury (systolic) and 90 millimetres (diastolic), and his pulse rate to 90 per minute. By October 5 the patient had improved, and his mental condition was clear. He was still weak bodily, but his blood pressure was 150 millimetres of mercury (systolic) and 100 millimetres (diastolic), and the "Corten" injections were suspended. He was allowed to sit up in bed. An electrocardiogram was normal, and Dr. Hogan made a diagnosis of "hemorrhage into supranrenal gland".

Dr. Lawrance commented that the case was an interesting one of hyperpiesis, with circulatory catastrophe occurring. The patient owed his life to Dr. Hogan's suggestions. Unfortunately, as he had a neuropathic personality and alcohol was his weakness, he would probably go out and resume his former drinking habits.

(To be continued.)

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Week-End Course at Armidale.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a week-end course will be held at the New England University College, Armidale, in conjunction with the Northern District Medical Association, on Saturday and Sunday, March 4 and 5, 1950. The programme is as follows:

Saturday, March 4: 2.25 p.m., Warden's welcome, Dr. R. B. Madgwick; 2.30 p.m., "Gastro-Intestinal Hemorrhage", Dr. A. W. Morrow; 3.15 p.m., "Differential Diagnosis and Treatment of Pelvic Tumours", Dr. F. A. Maguire; 4.30 p.m., "Diagnosis and Prognosis of Urological Conditions in General Practice", Dr. H. G. Cummine; 8.15 p.m., evening lecture or film session.

Sunday, March 5: 9.30 a.m., "Anti-Coagulants", Dr. H. G. Cummine; 10.15 a.m., "Vascular Occlusions", Dr. A. W. Morrow; 11.30 a.m., "Women Over Fifty Years", Dr. F. A. Maguire; 2 p.m., "Recent Advances in Urology", Dr. H. G. Cummine; 2.40 p.m., "New Drugs", Dr. A. W. Morrow; 3.20 p.m., "Common Infections of the Female Genital Tract", Dr. F. A. Maguire.

The fee for the course will be £2 2s. Those wishing to attend are requested to notify Dr. Harold G. Royle, Honorary Secretary, Northern District Medical Association, as soon as possible.

Correspondence.

A CASE OF HIDRADENOMA OF THE VULVAL REGION.

SIR: Regarding the comments of Mr. Leslie Gleadell (THE MEDICAL JOURNAL OF AUSTRALIA, January 14, 1950) on my article concerning a case of hidradenoma of the vulval region (THE MEDICAL JOURNAL OF AUSTRALIA, December 10, 1949), I was amazed at the irrelevant nature of his correspondence. He appears to have missed the whole purport of the article.

His first statement is so axiomatic as to be redundant and borders on the pedantic. The reason for his second statement, regarding the inadequacy of the operation for an epithelioma of the vulva, is hard to understand. The faulty pre-operative diagnosis in my case was epithelioma of the perineum, and I merely stated the surgical principle followed, namely, wide excision of the lesion including the inguinal glands of both sides. Whether this is a sound principle for treatment of epithelioma of this region I must leave to readers to decide. The operation itself was not described, as it was not pertinent to the theme of the article, which I tried hard in my inadequate way to summarize.

As the reported number of such cases is so small, few surgeons must have the good fortune of Mr. Leslie Gleadell to enable them to rely on their experience as an aid to diagnosis in such a condition. I considered that it might be helpful to other fallible beings like myself to report an uncommon pathological lesion (barely receiving mention in most standard text-books of pathology) and to offer some advice as to how they might avoid making a similar error of diagnosis to mine.

I sincerely trust that any would-be correspondents who are still young enough in years or experience to learn from their own errors and those of others will not be deterred from presenting their rare cases, including the not so successful ones, by the fear of irrelevant and destructive criticism.

Yours, etc.,

BRUCE BOSCECE, M.S., F.R.A.C.S.

Hobart,

February 3, 1950.

A HUSH-HUSH CONFERENCE.

SIR: On January 31 I heard by accident that an international conference on silicosis was to be held in Sydney at the end of February. It is usual on such occasions to invite men who are interested in the subject to attend such conferences and perhaps contribute a paper or take part in the discussion.

On February 8 the chairman of the Silicosis Commission informed me that he had been asked by the Premier to nominate an "observer" to attend the conference on the strict understanding that he should take no part in the discussion. I have informed him that such an appointment would be a waste of time and money, as no doubt the proceedings will be published and can be read later at leisure.

It seems rather extraordinary that the medical authority to the Silicosis Commission, two of whose members have been engaged in this work since 1921, and have dealt with thousands of cases of silicosis, should be almost completely ignored or given a grudging invitation to be present, with the proviso that they should be "bound and gagged".

I might mention that a member of the conference did not hesitate to search our medical records to gain information to put before conference without asking permission of the medical authority.

Yours, etc.,

J. G. EDWARDS,
Chairman of the Medical
Authority, Silicosis Com-
mission.

185 Macquarie Street,
Sydney,
February 10, 1950.

POLIOMYELITIS AND ROUTINE TONSIL AND ADENOID OPERATIONS.

SIR: Re statement of the Consultative Council for the Physically Handicapped published in the journal of January 28. It would clarify the position a lot if statements of this nature were supported, at least in scientific journals such as THE MEDICAL JOURNAL OF AUSTRALIA, with a statement of the facts in support of the opinions so definitely expressed. It is no trivial matter that the already embarrassing waiting lists in the ear, nose and throat departments of every hospital are further to be disorganized each year, especially if it be that the inspiration for such statements is not supported by statistical evidence. My readings on this subject seem to refute the belief that there is an increased risk either of contracting poliomyelitis or of bulbar involvement following nose and throat operations. What further

evidence have the members of the Consultative Council? If there is any, then let us have it, but just an odd case here and there cannot be accepted when the great volume of statistics reveal that the odd case is only coincidental. What are the total figures in New South Wales and in other parts of Australia over the past five or ten years? One may presume that a body of medical men sufficiently informed on this subject to issue a definite opinion will be able to answer:

1. Of the total patients suffering from poliomyelitis whose infections were notified and finally diagnosed, how many had recently had nose or throat operations?

2. Of the patients operated on for nose and throat conditions during periods when poliomyelitis was unusually prevalent, how many developed poliomyelitis within three weeks of the operation, and how many had the bulbar form?

3. Of patients developing the bulbar form, how many had had recent nose and throat operations and how many had not?

If figures of this nature be not available, then may one suggest, in order to be able truly to express an opinion, next year and in the years to come, that the Consultative Council will recommend to the various ministries of health, State and Federal, that an appropriate inquiry be instituted in order to answer these questions in a scientific manner in the future. It would not be difficult to question the relatives of every case of poliomyelitis notified during the past five years, and, if it has not been done, it should be practicable to demand of every doctor or hospital performing nose and throat operations during the period of an epidemic, that these cases be followed up for three to four weeks and the total number of operations, together with the total number who develop poliomyelitis, might be recorded and made available as future evidence to be compared with the figures published elsewhere.

Yours, etc.,

D. G. CARRUTHERS.

135 Macquarie Street,
Sydney,
February 2, 1950.

PINK DISEASE OR INFANTILE ACRODYNIA: ITS NATURE, PREVENTION AND CURE.

SIR: As senior pædiatricians in Melbourne, we wish to congratulate Dr. Donald Cheek and Sir Stanton Hicks, of Adelaide, on their recently published work on the above subject. We have each studied the clinical aspects very closely for more than twenty-five years and have accumulated records of cases and medical literature about pink disease and allied matters. What we have in our possession we shall be glad to make available to them or to anyone else who is undertaking a close analytical study of the subject.

It is perhaps premature to reach the conclusion that the nature, prevention and cure of pink disease can be considered as solved, but it is unquestionable that Cheek and Stanton Hicks have advanced evidence and stated conclusions of the utmost value as contributions towards those final answers.

We wish to offer some comments which we trust will be helpful. If any baby can get into the parlous state of florid pink disease through depletion of its stock of sodium chloride, we must attempt to prevent the depletion of the reserve by adding sufficient common salt to the feedings in the early months of all babies. Up to a point this is usually done with the addition of savoury food, such as broth, raw meat juice and vegetables, from five or six months of age, but it may be advisable to add a pinch of salt to all artificial feedings and to use normal saline instead of plain water for the naturally fed babies. Babies displaying hyperkinetic features, or those with a liability to skin eruptions or to diarrhoea and/or vomiting, should be investigated with a view to discovery of the need for additional sodium or chloride radicles. Hypotonic solutions should not be introduced intravenously without the establishment of the rationale of the hypotonicity beyond all question. Babies evincing a preference for savoury food should be allowed to indulge that predilection and, if they want salt on the cereals, it should not be denied to them. In short, we believe that Cheek and Stanton Hicks have shown trends in infantile nutrition with implications well outside the limitations of the comparatively uncommon pink disease syndrome.

We do not feel that the role of the suprarenal factor in the mechanism of pink disease, as advanced by our colleagues from Adelaide, is established yet on sufficiently sound

grounds for unreserved acceptance without further theoretical consideration, experimental work and clinical testing. In discussing the work with Dr. Cheek, one of us (R.S.) was impressed by his explanation of several of the clinical aspects on the basis of his new findings. This refers particularly to the tachycardia, the raised blood pressure, the profuse sweating and the outstanding incidence in the six months to two years age period. It is also consistent apparently with an infectious disease, such as measles, chickenpox, bronchopneumonia or gastro-enteritis, disturbing suprarenal function and upsetting the balance of sodium chloride metabolism, thus setting on its way the syndrome which we recognize clinically as pink disease.

It may be of interest to place on record the fact that babies in our care with pink disease have improved soon after initiation of treatment, but have taken a long time to reach the state which could fairly be described as a cure. We have done our utmost to maintain nutrition and have used raw meat juice, extracted from the meat or liver with salt; broths, vegetables and meat foods have been advocated specifically and have contained salt; and "Vegemite" has been used, frequently in large amounts, in the belief that the high vitamin B content would be beneficial. "Vegemite" contains approximately 15% of "ash", of which about two-thirds is sodium chloride.

It is most gratifying to us and, we feel sure, to all Australians that further elucidation of this problem should have originated in Adelaide, where the late Harry Swift first recognized pink disease as a clinical entity. Our best wishes go with them for a continuance of this most interesting piece of work, which certainly presents wonderful possibilities.

Yours, etc.,

H. BOYD GRAHAM.
ROBERT SOUTHEY.

Melbourne,
Victoria,
February 10, 1950.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 8, of February 9, 1950.

NAVAL FORCES OF THE COMMONWEALTH.

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Honorary Physician and Honorary Surgeon.—Surgeon Commanders Henry Woodall Gault and Geoffrey Joseph Kelleher Lane are appointed Honorary Physician and Honorary Surgeon, respectively, to His Excellency the Governor-General for a period of three years, dated 18th July, 1949. The appointments of Surgeon Commanders James Martin Flattery, O.B.E., and Charles Anthony Downward, D.S.C., as Honorary Physician and Honorary Surgeon, respectively, to His Excellency the Governor-General are terminated, dated 17th July, 1949.

Citizen Naval Forces of the Commonwealth.

Royal Australian Naval Reserve.

Promotion.—Surgeon Lieutenant Richard Robsart Rogers is promoted to the rank of Surgeon Lieutenant-Commander, dated 16th October, 1949.

Royal Australasian College of Surgeons.

PRIMARY EXAMINATION FOR THE F.R.A.C.S.

1. A PRIMARY EXAMINATION in anatomy (including normal histology) and applied physiology and the principles of pathology will be conducted in Melbourne in November, 1950.

2. The examination will begin with written papers on Monday, November 13, 1950.

3. The examination is reciprocal with the primary examination for Fellowship of the Royal College of Surgeons of England.

4. Each candidate will be notified, by post, of the result at the termination of the examination.

5. The examination is open to graduates of not less than one year's standing of a medical school approved by the council of the College for the purpose.

6. Candidates must submit evidence of their qualification, and of the date of acquirement thereof.

7. Forms of application for admission to the examination may be obtained from the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1.

8. The fee for admission, or readmission, to the examination is £15 15s. Australian currency (*plus* exchange on cheques drawn on banks outside Melbourne). The fee must be forwarded with the form of application so as to reach the Secretary at his office not later than October 1, 1950.

COURSE FOR PRIMARY FELLOWSHIP EXAMINATION.

SUBJECT to the receipt of a satisfactory entry, the Royal Australasian College of Surgeons will conduct a course in anatomy (including normal histology) and applied physiology and the principles of pathology in Melbourne for the primary fellowship examination. The course is open to all medical graduates.

The course will begin in Melbourne on July 24, 1950, and conclude on October 26, 1950. It will consist of six sessions per week. A detailed syllabus is available on application. The fee for the course is £31 10s.

Graduates desiring to enrol for this course should register with the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne, C.1, and at the same time forward the amount of the fee (£31 10s. *plus* exchange on cheques drawn on banks outside Melbourne).

Entries for the course close on July 1, 1950. Graduates not resident in Melbourne must notify the Secretary of their Melbourne address immediately after arrival.

Corrigendum.

IN the issue of January 28, 1950, there appeared an article on pink disease by Dr. Donald B. Cheek. Dr. Cheek had the technical assistance of Mr. H. C. T. Stace. In the title of the article as received by this journal Mr. Stace is stated to be from the Waite Agricultural Research Institute. He has written to explain that this is an error and that he is associated with the Division of Soils, Commonwealth Scientific and Industrial Research Organization.

Research.

THE WILLIAM GIBSON RESEARCH SCHOLARSHIP FOR MEDICAL WOMEN.

MISS MAUD MARGARET GIBSON has placed in the hands of the Royal Society of Medicine a sum of money to provide a scholarship in memory of her father, the late Mr. William Gibson, of Melbourne. The scholarship is awarded from time to time by the society to qualified medical women who are subjects of the British Empire, and is tenable for a period of two years, but may in special circumstances be extended to a third year. The next award will be made in July, 1950, to date from October, 1950.

In choosing a scholar the society will be guided in its choice either by research work already done by her, or by research work which she contemplates. The scholar shall be free to travel at her own will for the purpose of the research she has undertaken. There is no competitive examination, nor need a thesis or other work, for publication or otherwise, be submitted. The society has power at any time to terminate the grant if it has reason to be dissatisfied with the work or conduct of the scholar.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED FEBRUARY 4, 1950.

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory. ^a	Australian Capital Territory.	Australia. ^a
Ankylostomiasis	•	..	1	..	..	..	..	..	1
Anthrax	•	•	•	•	•	•	•	•	..
Beriberi	•	•	•	•	•	•	•	•	..
Bilharziasis	•	•	•	•	•	•	•	•	..
Cerebro-spinal Meningitis	•	2	..	..	..	..	..	..	2
Cholera	•	•	•	•	•	•	•	•	..
Coastal Fever(a)	•	•	•	•	•	•	•	•	..
Dengue	•	•	•	•	•	•	•	•	..
Diarrhoea (Infantile)	•	•	4(4)	•	•	•	•	•	4
Diphtheria	5(2)	8(7)	3(1)	•	3(3)	•	•	•	19
Dysentery (Amoebic)	•	1(1)	•	•	•	•	•	•	1
Dysentery (Bacillary)	•	•	6(5)	•	•	•	•	•	6
Encephalitis Lethargica	•	•	•	•	•	•	•	•	..
Erysipelas	•	•	•	1	•	•	•	•	1
Filariasis	•	•	•	•	•	•	•	•	..
Helminthiasis	•	•	•	•	•	•	•	•	..
Hydatid	•	•	•	•	•	•	•	•	..
Influenza	•	•	•	•	•	•	•	•	..
Lead Poisoning	•	•	•	•	•	•	•	•	..
Leprosy	•	•	•	•	•	•	•	•	..
Malaria(b)	•	•	•	2	•	•	•	•	3
Measles	•	•	•	•	•	•	•	1	..
Plague	•	•	•	•	•	•	•	•	..
Poliomyelitis	23(14)	5(2)	•	38(36)	•	2(2)	•	•	68
Pittacosis	•	•	•	•	•	•	•	•	..
Puerperal Fever	2(2)	•	•	1(1)	•	•	•	•	3
Rubella(c)	•	•	•	•	•	•	•	•	..
Scarlet Fever	14(11)	17(9)	3(1)	2(1)	1	•	•	•	37
Smallpox	•	•	•	•	•	•	•	•	..
Tetanus	•	•	•	•	•	•	•	•	..
Trachoma	•	•	•	•	•	•	•	•	..
Tuberculosis(d)	18(15)	10(6)	2(1)	5(4)	14(11)	•	•	•	40
Typhoid Fever(e)	•	•	•	•	•	•	•	•	..
Typhus (Endemic)(f)	•	•	•	•	1(1)	•	•	•	1
Undulant Fever	•	•	•	•	•	•	•	•	..
Well's Disease(g)	•	•	•	•	•	•	•	•	..
Whooping Cough	•	•	•	3(4)	•	•	•	•	8
Yellow Fever	•	•	•	•	•	•	•	•	..

^a The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 37, 1946-1947. Figures in parentheses are those for the metropolitan area.

^b Figures not available.

^c Figures incomplete owing to absence of returns from the Northern Territory.

^d Not notifiable.

(a) Includes Moxman and Sarina fevers. (b) Mainly relapses among servicemen infected overseas. (c) Notifiable disease in Queensland in females aged over fourteen years. (d) Includes all forms. (e) Includes enteric fever, paratyphoid fevers and other *Salmonella* infections. (f) Includes scrub, murine and tick typhus. (g) Includes leptospirosis, Weil's and para-Weil's disease.

Applications should be accompanied by a statement of professional training, degrees or diploma, and of appointments, together with a schedule of the proposed research. Applications must be accompanied by testimonials, one as to academical or professional status and one as to general character. Envelopes containing applications *et cetera* should be marked "William Gibson Research Scholarship" and should be addressed to Mr. G. R. Edwards, Secretary, Royal Society of Medicine, 1 Wimpole Street, London, W.1, England, and be received not later than June 1, 1950. The approximate value of the scholarship will be £200 per annum.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the Medical Practitioners Act, 1933-1939, of New South Wales, as duly qualified medical practitioners:

- Bean, Roy Herbert Donald, M.B., B.S., 1944 (Univ. Melbourne), District Hospital, Parramatta.
 Clark, Maurice, M.B., B.S., 1949 (Univ. Melbourne), District Hospital, Broken Hill.
 Cleary, Leo Francis, M.B., B.S., 1949 (Univ. Melbourne), District Hospital, Broken Hill.
 Cumming, Ian Harry, M.B., B.S., 1938 (Univ. Melbourne), F.R.A.C.S., 1948, 741 Young Street, Albury.
 Egan, Eugene, M.B., B.Ch., 1926 (N.U. Ireland), D.P.H., 1929 (Univ. London), 25 Duntroon Avenue, Roseville.
 Gillespie-Hill, Rachel Noeleen, L.M.S.S.A. (London), 1931, M.R.C.S. (England), L.R.C.P. (London), 1932, Hotel Pacific, Manly.
 Gough, Keith Owen, M.B., B.S., 1947 (Univ. Melbourne), Ivor Street, Henty.
 Turnbull, Reginald John David, M.B., B.S., 1933 (Univ. Melbourne), c/o. Union Bank, Sydney.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

- Fischer, Enid May, provisional registration, 1949 (Univ. Sydney), 8 Grosvenor Crescent, Cronulla.
 De Coek, Nanette Marie, provisional registration, 1949 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
 Finch, Richard Tennant, provisional registration, 1949 (Univ. Sydney), Western Suburbs Hospital, Croydon.
 Breinl, William, provisional registration, 1949 (Univ. Sydney), 49 Carabella Street, Kirribilli.
 McGlynn, John Richard, M.B., B.S., 1948 (Univ. Sydney), 6 Daisy Street, Chatswood.
 Way, Stephanie Susie Jay, provisional registration, 1949 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
 Frischer, Isaak, provisional registration, 1949 (Univ. Sydney), "Darnley", Macarthur Avenue, Crow's Nest.
 Plowman, Roderick Leopold, M.B., B.S., 1948 (Univ. Sydney), 76 Summer Street, Orange, New South Wales.

The undermentioned have been elected as members of the South Australian Branch of the British Medical Association:

- McRobert, Helen Angus, M.B., B.S., 1949 (Univ. Adelaide), 225 Portrush Road, Glenunga.
 Seith, Wolfram Immanuel, M.B., B.S., 1949 (Univ. Adelaide), 41 Lambert Road, Joslin.
 Plueckhahn, Vernon Douglas, M.B., B.S., 1949 (Univ. Adelaide), 73 Mills Street, Clarence Park.
 Last, John Murray, M.B., B.S., 1949 (Univ. Adelaide), 7 Olive Street, Glenelg.
 Ducray, Suzette Eleanor, M.B., B.S., 1949 (Univ. Adelaide), Royal Adelaide Hospital, Adelaide.
 Simpson, Donald Allen, M.B., B.S., 1949 (Univ. Adelaide), 42 Lockwood Road, Burnside.
 Nicholls, Edward Maxwell, M.B., B.S., 1949 (Univ. Adelaide), Darwin Hospital, Darwin.

- Souter, Douglas Tod, M.B., B.S., 1949 (Univ. Adelaide), 258 Glen Osmond Road, Fullarton.
 Grant, Allan Kerr, M.B., B.S., 1947 (Univ. Adelaide), 87 Park Terrace, North Unley.

Diary for the Month.

- FEB. 28.—New South Wales Branch, B.M.A.: Ethics Committee.
 MAR. 1.—Western Australian Branch, B.M.A.: Council Meeting.
 MAR. 2.—New South Wales Branch, B.M.A.: Special Groups Committee.
 MAR. 1.—Victorian Branch, B.M.A.: Branch Meeting.
 MAR. 2.—South Australian Branch, B.M.A.: Council Meeting.
 MAR. 3.—Queensland Branch, B.M.A.: Branch Meeting.
 MAR. 7.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 MAR. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 MAR. 10.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester United Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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